IMPLEMENTING THE TEACHING HANDWRITING, READING AND SPELLING SKILLS PROGRAMME WITH AN INTERMEDIATE PHASE DEAF GAUTENG LEARNER USING THE SPOKEN LANGUAGE APPROACH

by

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submitted in accordance with the requirements
for the degree of

MASTER OF EDUCATION

in the subject

INCLUSIVE EDUCATION

at the

UNIVERSITY OF SOUTH AFRICA

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JANUARY 2013

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DECLARATION

I declare that 'IMPLEMENTING THE TEACHING HANDWRITING, READING AND SPELLING SKILLS PROGRAMME WITH AN INTERMEDIATE PHASE DEAF GAUTENG LEARNER USING THE SPOKEN LANGUAGE APPROACH' is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

_____ _____

SIGNATURE DATE

V. P. Mumford

ACKNOWLEDGEMENTS

I wish to acknowledge and express my profound gratitude to:

- My Heavenly Father from whom I gained so much strength. Thank you for keeping me on this journey.

- My husband of many years, who has always wholeheartedly supported my further studies, looked after our children so that mom could study, and encouraged me when I needed to be motivated.

- My children who, although long out of the nest, have always spoken of me with such pride and have continued to boost my ego.

- My colleagues, who have continually supported my endeavours, and have unselfishly stood in for me so many times.

- My deaf learner and her family for committing themselves so enthusiastically to this study. You have been an inspiration to me. In the many years that I have been in education, never have I experienced such determination in a child and such dedication from her parents.

- My supervisor, Prof. Anna Hugo, for her invaluable advice, guidance, support and encouragement.

DEDICATION

This dissertation is dedicated to my son, Rowan. It is because of you that I started on this long quest for knowledge in respect of children with barriers to learning. We together went on a prolonged journey involving much therapy over the years. When I see this man before me today I burst with pride over what you have achieved in life. You are truly a gift. So many children have benefitted over the years from the journey that you and I embarked on. God Bless you, Rowan!

ABSTRACT

The rationale for this study was to investigate the implementation of the THRASS literacy programme on a deaf learner who uses the spoken language approach. Particular emphasis was given to the role played by the Phoneme Machine together with Cued Speech.

THRASS focuses on phoneme-grapheme correspondence by explicit phonics instruction to develop word analysis and recognition skills. Cued Speech is used as an instructional tool to facilitate visual access to auditory-based phonology.

The research was framed within the Interpretivist paradigm and a qualitative case study design predominated, although the launch and landing of the study was quantitative in nature.

The findings indicated that the auditory-based phonology of the English language may be accessed by a deaf learner, when supported by a visual instructional tool such as Cued Speech in synchronicity with speech-reading, to develop print literacy skills.

This study opens the gateway to further enquiry on enhancing deaf literacy levels.

KEY WORDS: Alphabetic Principle, articulation, collaborative co-teaching, Cued Speech, deafness, Inclusion, language acquisition, phonology, phonological awareness, phonemic awareness, phonics, Phoneme Machine, reading, spelling, spoken language approach, THRASS.

ACRONYMS

A-0	Auditory-Oral or Aural-Oral
A-V	Auditory-Visual
CI	Cochlear Implant
CS	Cued Speech
CSSA	Cued Speech Association of South Africa
CSAUK	Cued Speech Association of the United Kingdom
DEAFSA	Deaf Federation of South Africa
FM System	Frequency Modulation System
DHH	Deaf or Hard-of-Hearing
NID	National Institute for the Deaf
NRP	National Reading Panel
PG	Phoneme Grid
THRASS	Teaching Handwriting, Reading and Spelling Skills
UN	United Nations
UNESCO	United Nations Educational, Scientific, and Cultural Organisation
UNICEF	United Nations Children's Fund (originally called the United Nations International Children's Emergency Fund)
WG	Word Grid

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INTRODUCTORY ORIENTATION AND STATEMENT OF THE PROBLEM

1.1 INTRODUCTION

> Inclusion allows us to acknowledge that the traditional categories of ‘’able bodied’’ and ‘’disabled’’ don’t make much sense because we are all complex humans, and the line between ‘’us’’ and ‘’them’’ is constantly shifting and therefore meaningless (Sapon-Shevin 2007:22).

Inclusion in education is built on the premise that education is a fundamental, basic human right and the foundation of a more just society for all citizens; thus encompassing a social model in understanding educational problems (Landsberg & Gericke 2006:15,22). The concept of inclusive education was born out of the World Conference on Special Needs Education in Salamanca, Spain, in 1994, as a worldwide strategy for attending to the learning needs of all disadvantaged, marginalised and excluded learners - inclusive education is not just about accommodating learners with disabilities in mainstream school settings (Oswald 2005:140,146). Inclusive education may be viewed as both a response and a contribution to international economic and other trends because, not only is it linked to global economic developments, but it is also supported by a globalised discourse of fundamental human rights and entitlements driven by international declarations and international organisations (Artiles & Dyson 2005:37).

There is very little information regarding inclusive education in the majority of African countries. However, Kalabula (2000) has stated that although many African countries have formulated policies with regard to Special Education and have aspired to support equality of education for all, the majority of children with special education needs have not been adequately catered for.

Within the southern African context inclusive education is also underpinned by issues of equity and improving the capacity of education systems to act in response to the diverse needs that each learner brings to the teaching and learning event (Howell 2007:99). Nonetheless, as with the majority of initiatives that have been employed in any country’s attempt to liberate itself from historical disparities and build a democratic, humane and just society, the policy of inclusive education comprises a dual process of ‘’educational reconceptualisation’’ and ‘’radical reconstruction’’ (Slee, quoted in Howell 2007:99).

From a South African perspective, the context of education is complex because not only has it been shaped by colonial heritage, but also by the structures of the apartheid regime. After the country became a democracy in 1994 the New Constitution included a Bill of Rights pledging basic education for all; with the notions of human rights, equity and redress forming the cornerstones of all legislation and education policy (Stofile & Green 2007:4). Segregation on the grounds of race; the vast disparities in per capita funding; inequities in both mainstream and special education; departmental fragmentation; duplication of functions, responsibilities and services coupled with imbalances with regard to opportunities, expectations and educational rights were the flavour of the day under the apartheid government (Lomofsky & Lazarus, quoted in Stofile & Green 2007:52-53; Stofile & Green 2007:53).

Thus, the priority of those transforming education policies was to address disparities and inequalities with the challenge being to create a single, unified system of education and to build capacity within this system in order to provide quality education to all learners within the system. Several policy initiatives were developed addressing, amongst others, the needs for equity of educational access, non-discrimination and redress. These policies were influenced by the parallel international drive towards inclusive education and the emphasis on replacing the former charity or medical discourses concerning disability, with a rights discourse. White Paper 6 on inclusive education has endeavoured to transform the mainstream schooling system in order to accommodate both vulnerable and disabled learners (Naicker 2005:232; Stofile & Green 2007:53).

In *Education White Paper 6. Special Needs Education: building an inclusive education and training system (2001),* which is now accepted as policy, it is stated that inclusion involves the support of all learners, educators and the system in its entirety, in order to meet the full range of learning needs. Learning needs may stem ''from a range of factors including physical, mental, sensory, neurological and developmental impairments, psycho-social disturbances, differences in intellectual ability, particular life experiences or socio-economic deprivation''. The focus is on overcoming barriers in the system by making available adaptive strategies and support systems in the classroom (Department of Education 2001:17). This entails bringing education to the child and teaching the child as opposed to teaching the curriculum.

As has been stated, the concept of Inclusive Education – whether it is on an international platform or within the South African context in particular – is underpinned by the need to support all learners in the least restrictive environment in order to meet the full range of learning needs. An investigation into the efficacy of implementing any intervention programme, such as the one under review, is thus indispensable in order that support may be offered to learners in their

diversity.

1.2 DEAFNESS AND DEAF EDUCATION

> An issue of prime importance with regard to deaf education and deaf individuals has been patterns of literacy achievement and difficulties in this area that are faced by most students who are deaf or hard of hearing (Marschark & Spencer 2003:4).

Storbeck (2007:348) states that "deafness is one of the largest categories of impairments in South Africa and encompasses the full spectrum of hearing loss – from mild to total or profound deafness". Statistics South Africa indicated that in 2001 there were no less than 412 421 people who are profoundly deaf and 1 237 264 people with severe hearing loss in the country (National Institute for the Deaf [NID] 2009: ¶ 4).

Generally speaking, the majority of learners who are deaf have hearing parents (Schick 2003:219). Storbeck (2007:354) ratifies this statement by indicating that as much as 90 per cent of children who are deaf are born to hearing parents. Hearing parents of children who are deaf tend to favour the *oral* or *spoken language approach* to communication as opposed to the *manual* or *sign language approach* because oralism - although an approach which reinforces the medical model of deafness as being a deficit to be remediated - allows children who are deaf to assimilate with the hearing majority (Archbold 2000:259; Storbeck 2007:354).

Oralism places major emphasis on use of the spoken word in synchronicity with speech reading (previously known as lip-reading) ability and auditory training or learning; with residual hearing augmented by amplification technology such as hearing aids or cochlear implants. There are two major groups of approaches to oralism: unisensory and multisensory. Unisensory approaches centre on the development of audition (auditory modality only). The unisensory approach is known as the auditory, aural-oral, aural, Auditory-Verbal (O-V), acoupedic, acoustic or auditory-global method. In contrast, the multisensory approach embraces a balance of audition and vision (auditory and visual modality) where visual cues are used to supplement speech reading ability. This approach is known as the Auditory-Oral (A-O) method and Cued Speech is an example of such an approach. The multisensory approach may include a tactile component when necessary and this is called the auditory-visual-tactile technique (Trezek, Wang & Paul 2010:211). This spoken language approach is based on the tenet that developing proficiency in both expressive and receptive spoken language is an attainable goal for people who are deaf or hard-of-hearing (Florida Department of Education [FLDoE] 2007:2).

Manualism refers to the use of visual-gestural language with its own grammatical structures which differ from spoken language (FLDoE 2007:2). This approach is favoured by the Deaf community and it falls within the inclusionary framework of the social paradigm (Storbeck 2007:354). However, Marschark and Spencer (2003:492) maintain that "… no single method of communication is going to be appropriate for all deaf children".

The age of onset and aetiology of hearing loss coupled with learning styles of children who are deaf or hard-of-hearing, as well as the family dynamics and the choice of communication methods, impact considerably on educational placement. These learners may be placed in Schools for the Deaf where sign language or manualism is the mode of communication, or in schools which embrace oralism, the auditory-oral or aural-oral approach (Ohio Coalition for Children with Disabilities [O.C.E.C.D.] n.d.:3-4). Storbeck (2007:353) concurs by stating that parents of learners who are deaf have challenging decisions to make with regard to both the communication approaches and the education options available to their children who are deaf. Although not without controversy, parents also need to consider the option of cochlear implantation (Archbold 2000:257).

It has been a customary worldwide trend for learners who are deaf to be placed in specialised education environments for the 'deaf' or 'hard-of-hearing'. However, the 1970s and 1980s saw a movement towards the integration of learners who are deaf into mainstream school settings with various levels of support. The contemporary global trend of education for all revolves around the concept of inclusion in the least restrictive environment (Archbold 2000:257). One of a number of specific characteristics inherent in learners who are deaf that needs to be considered when designing and implementing effective educational objectives and learning experiences in order to best support these learners in the least restrictive learning environment, is the fact that learners who are deaf achieve well below their hearing peers in the area of language acquisition, with the gap increasing as they progress through the schooling system (Traxler, quoted in Power & Leigh 2003:43). Currently a large percentage of deaf and hard-of-hearing children are accommodated in inclusive classroom settings along with their hearing peers (Martin 2007:3-4).

It seems evident that in order for the education system to be able to provide support to learners who are deaf - in the least restrictive environment and in inclusive classroom settings - it is imperative that research is undertaken with regard to implementing programmes which may best support the literacy development of these learners.

Stobbart (2006:iii) states that the poor levels of literacy attained by learners who are deaf have troubled educators and researchers equally. Although reading achievement among learners who are deaf has received a great deal of focus over the past two decades, there is still much

evidence that their levels of reading attainment remain seriously deficient (Trezek & Malmgren 2005:256). Research has revealed that the performance in reading comprehension of learners who are deaf is about six grade levels below that of their hearing peers (Karchmer & Mitchell 2003:27). McAllister (quoted in Stobbart & Alant 2008:1) indicates that approximately 66 per cent of adults in South Africa who are deaf are functionally illiterate and unemployed. Marschark and Spencer (2003:493) advise that even though creative solutions in addressing the poor literacy levels of learners who are deaf have been sought over a number of decades, these learners are still developing at an extremely slow pace in comparison to their hearing peers in learning to read. No matter what type of background learners who are deaf come from, the majority have a tendency to be unable to map written expressive language onto a linguistic system known to them, the result of which is a diminished understanding of language (Albertini & Schley 2003:125). Power and Leigh (2004:xvii) are of the opinion that successful advancement in the literacy levels of learners who are deaf is "… the single greatest challenge that has faced the field of deaf education…" and that in order to support the literacy needs of these learners requires the use of new approaches. The Teaching Handwriting, Reading and Spelling Skills (THRASS) literacy programme may be considered as a new approach to potentially support the literacy levels of learners who are deaf or hard-of-hearing. This programme has been chosen above other programmes of a similar nature because it is in keeping with the Auditory-Oral or spoken language approach. The programme incorporates the use of a Phoneme Machine (see section 3.1) to demonstrate the human lip movements of spoken words as a visual component in congruence with auditory-based speech sounds to augment speech reading, and improve access to the phonology of the English language. Additionally, there is a Cued Speech option (see section 3.1) included in the programme. This is a visual communication system used to discriminate information and thus supports speech reading. (See section 2.3.1.3).

1.3 THE TEACHING HANDWRITING, READING AND SPELLING SKILLS (THRASS) PROGRAMME

1.3.1 An overview

The Teaching Handwriting, Reading and Spelling Skills (THRASS) programme is a whole-school, multi-sensory literacy programme based on the use of *synthetic phonics* to build phonemic awareness by teaching learners to utilise meta-cognitive strategies and word-solving skills when reading and spelling. The 44 phonemes (speech sounds) and the 120 graphemes (spelling choices) of written receptive and expressive English are the key elements around which the THRASS Programme is built (THRASS. nd. Key facts about THRASS). (See Chapter Three for an in-depth discussion of the THRASS programme).

The THRASS literacy programme has been implemented in many schools in Europe, the Middle East, Australia, South America, Central America, the United States of America, and Africa including southern Africa and Sub-Saharan Africa. The programme has been embraced by a number of universities in South Africa and the two-day accredited course in THRASS has become part of the academic programme for aspirant educators. In addition ABSA has rolled out an extensive sponsorship programme in the form of substantial donations of THRASS materials to various schools as part of 'The THRASS Absa Talk Together Literacy Project'. Varsity College, which has eight campuses, and is a licensed tuition provider of The University of South Africa (UNISA), joined the THRASS Absa Talk Together Literacy Project in January 2009. UNISA is the principal provider of student educators in South Africa and all third year B.Ed. student teachers are being introduced to the THRASS programme to equip them to teach literacy in schools (Inspired 2008:19).

The THRASS Phoneme Machine software forms an integral part of the THRASS Literacy programme. In January 2009 the THRASS Phoneme Machine Version 6 software, incorporating the *Cued Speech* (CS) option, was launched as an additional support strategy for learners who are deaf. In the Cued Speech option of the software, the shapes, positions and movements of the hands utilised in Cued Speech are presented next to the associated moving human lips, allowing up to 96 per cent of spoken language to be lip-read with greater accuracy. The updated version 6.1 was released on the 1st of October 2009 (THRASS. nd. Deaf children to be taught synthetic phonics). This version includes video clips of a Cued Speech transliterator demonstrating the hand shapes and associated mouth positions to represent the phonemes which make up words.

Cued Speech as a mode of communication is a system of manual signals or cues which are produced in coordination with visual mouth speech patterns to provide learners who are deaf with a sound-based model of oral expressive language via the visual modality (Krause, Kegl, & Schick 2007:433). Cued Speech as such does not fall into the categories of oralism or manualism as deaf communication methods. This system of visually expressing oral language at the phonemic level to represent clusters of visually distinct vowels and diphthongs is used in synchronisation with speech in order to disambiguate phonemes or syllables which may be confused through speech reading on its own (Krause, Kegl & Schick 2007:433; Leybaert & Alegria 2003:262-263). The THRASS programme has been chosen for evaluation in this study specifically because the programme incorporates the Phoneme Machine software together with Cued Speech to support the development of phonology in learners who are deaf, and who utilise the spoken language approach.

Phonology refers to the sound structure of spoken language in terms of the perception (reception), representation (print symbols) and production (expression) of speech sounds and this includes the prosodic elements of intonation, rhythm, stress and timing, as well as the articulatory units of phonemes, syllables and words. Phonological awareness refers to the awareness of the sound system of a language and the ability to recognise spoken language structures such as syllables or 'chunks' of sounds and rhymes that are separate from meaning. Phonemes are the smallest linguistic units of sounds and these are represented by graphemes which are the smallest units of written language – that is, letter symbols. Phonemes are considered the building blocks of any language, and phonemic awareness indicates the ability to manipulate phonemes in terms of analysis and synthesis – this ability is reliant on the development of phonological awareness. Phonics is concerned with the mapping or correspondence of phonemes to graphemes; and the awareness that printed symbols systematically represent spoken words is referred to as knowledge of the Alphabetic Principle (Trezek, Wang & Paul 2010:46,209,211).

The direct and explicit teaching of phonics by letter-sound correspondence is central to the THRASS programme, the aim of which is to develop knowledge of the fundamental building blocks of phonology, namely the phonemes of English and their corresponding graphemes, and thus increase phonological awareness. After extensively reviewing research aimed at identifying the skills and methods of instruction associated with reading achievement, the National Reading Panel (2000) identified the elements of phonemic awareness, phonics, fluency, vocabulary and comprehension as critical to the acquisition of reading skills. This is in keeping with Chall's Stages of Reading Development which highlights the elements of phonemic awareness and phonics as pre-requisite skills in order to make the eventual transition from learning to read to reading to learn (Trezek et al 2010:32-34). The THRASS programme is centred on Word Level Teaching to addresses the critical pre-requisite reading skills of phonemic awareness and phonics; and the development of these skills is supported by the inclusion of Cued Speech as a supplementary reading instructional tool to subsidise speech reading. Cued Speech is a vehicle for accessing the phonology of the English language, because phonemes cannot be fully discriminated by speech reading alone when using the spoken language approach as mode of communication.

Classroom action research carried out by Grindal (2004:62) indicated the need for utilising an explicit phonics programme to support the development of literacy skills in learners who are deaf. Grindal (2004:60) further stated that "…it would be beneficial to establish the impact of THRASS when used with additional strategies such as Cued Speech, Visual Phonics or lip-reading skills." However, there is a dearth of research on the theory of THRASS, and insufficient studies of rigor have been carried out to appraise the effectiveness of this programme.

1.3.2 Lack of research on THRASS

Although there is a fairly extensive amount of information on an International level regarding the literacy attainments of learners who are deaf, there is a paucity of research within the South African context. This has necessitated the use of primarily international literature to provide the theoretical framework underpinning this study. Specifically, there is a dearth of research with regard to intervention studies – and this includes the Teaching Handwriting, Reading and Spelling Skills programme (THRASS) - in respect of best practices for enhancing the literacy levels of learners who are deaf. There is also hardly any current research related to the use of literacy intervention programmes in respect of learners who are deaf and in inclusive educational settings within the South African context. This absence of research indicates the need for investigating the implementation of a literacy programme with learners who are deaf.

Research has indicated that learners who are deaf and who use a phonological code when reading are at an advantage because "…the reciprocal relation between spoken and written language is activated by the association between phonology and orthography" (Paul 2003:106). Trezek and Malmgren (2005:269) concur by indicating that recent studies have revealed the efficacy of direct instruction in phonics and phonemic awareness on the reading skills of deaf and hard-of-hearing Middle School learners. Wang, Trezek, Luckner & Paul (2008:405) emphasise the critical importance of incorporating instructional tools such as Visual Phonics and Cued Speech into reading instruction and teaching strategies if learners who are deaf are to increase their literacy levels.

Research-based evidence indicates that the THRASS Literacy Programme has a positive influence on the growth in the ability of deaf learners to read and spell by virtue of their ability to access phonological information (Grindal 2004: 62). Worsfold, Executive Director of Cued Speech Association UK, has stated that the use of the new THRASS software will result "… in more deaf children achieving literacy levels equivalent to hearing children" (International Business Times 2008:2). Diederichs (International Business Times 2008:2), an educator at a School for the Deaf in Kwa-Zulu Natal, and founder of Cued Speech South Africa (CSSA), indicated that by utilising the THRASS programme and cueing simultaneously in the classroom, the language, spelling and reading skills of her deaf learners have increased substantially; even prior to her incorporating the newer version of the Phoneme Machine with the additional Cued Speech software. However, much of the information about the efficacy of this programme is anecdotal and there is a lack of sufficient empirical evidence to support this.

The intention of this research undertaking is to establish the efficacy of the THRASS programme in developing the literacy skills of an Intermediate Phase deaf learner who uses the spoken language approach. A specific objective of this study is to establish the role played by the Phoneme Machine together with the Cued Speech option, both of which are part and parcel of the programme, in supporting the development of phonological and phonemic awareness as pre-requisite skills for the acquisition of the higher order skills of reading and writing. The rationale and motivation for this study leads to the formulation of the problem statement.

1.4 STATEMENT OF THE RESEARCH PROBLEM

1.4.1 Introduction

Preliminary steps in research revolve around the process of asking questions and formulating problem statements related to educational practices in order to guide research; and this implies the opportunity to gather and analyse data. Qualitative research problem statements are expressed as research purposes or questions (McMillan & Schumacher 2006:51).The problem statement identifies what the problem is, why is it a problem, what has been done previously in an attempt to deal with the problem and whether any previous attempts were sufficient to solve the problem (Hofstee 2006:85). A noteworthy problem statement is one that will support the development of theory, provide knowledge, inform practice, add insight to a broader phenomenon, enhance methodology, is exploratory in nature or is associated with current issues and trends (McMillan & Schumacher 2006:67). To formulate a problem statement in the qualitative research paradigm the researcher must begin with the selection of a specific case for in-depth study (McMillan & Schumacher 2006:61). A case may refer to any one phenomenon such as, for example, one program, one process, one student, one group of students, or one policy (McMillan & Schumacher 2006:316). This study involves a programme as the case.

This study investigates and attempts to establish the extent to which the implementation of the Teaching Handwriting, Reading and Spelling Skills (THRASS) literacy programme - which includes the use of additional strategies such as the Cued Speech option incorporated in the computerised Phoneme Machine software which form part of the THRASS programme – supports the literacy development of an Intermediate Phase learner who is profoundly deaf and who uses the auditory-oral or spoken language approach as method of communication, with the aid of bilateral cochlear implants. The study takes place in an inclusive setting in an Independent School and a single case study design is employed.

1.4.2 The need for research based on experience

The researcher, who has been involved in education for over thirty years, is based at a small private, inclusive school in Johannesburg which caters specifically for learners from Grade One to Grade Twelve who require additional support beyond that which they are able to access in the larger classes found in most mainstream schools. There are between 6 and 12 learners in a group. A multilevel teaching approach is used, and learners straddle the Grades and Phases where necessary. Multilevel teaching is underpinned by the principles of individualisation, flexibility and inclusion in order to involve all learners in classroom activities despite their diversity. Straddling of Grades and Phases is implemented as an adaptive procedure for learners who are unable to fit into a particular grade or phase because of the barriers to learning they may experience (Department of Education 2005:23,90).

During the latter part of 2008 the researcher was approached by the hearing parents of a learner who is deaf and who had been attending a special school where she followed an essentially Individualised Education Programme (IEP). The learner, born with apparently 'normal hearing', contracted pneumococcal meningitis at the age of 1 year 8 months, resulting in profound bilateral, sensorineural hearing loss. The learner has been implanted with bilateral cochlear units, and the parents have opted for the Auditory-Oral (aural-oral) or spoken language approach as method of communication for their child. This method of communication is used in the home environment and this is the communication method of choice for when their daughter is taught at school. (See section 1.2 and 2.3). The spoken language approach centres on the elements of speech reading augmented by residual hearing with the aid of amplification technology (bilateral cochlear implants) to support both the comprehension and production of spoken language (Marschark & Hauser 2012:53).

The researcher has recently attended both the Teaching Handwriting, Reading and Spelling Skills (THRASS) accredited course as well as a follow-up refresher course. The school has also been sponsored by ABSA with regard to resource material, and baseline assessments have been completed throughout the school. This has afforded the researcher the opportunity to conduct research. The researcher is of the opinion that by implementing the THRASS literacy programme, which incorporates the Phoneme Machine together with the Cued Speech option, the deaf learner may possibly be supported in gaining higher *levels of literacy*. The researcher has also recently attended a Cued Speech Foundation Course run by Cued Speech South Africa.

1.4.3 The problem statement

The inadequate levels of literacy achieved by learners who are deaf or hard-of-hearing have been of on-going concern for both educators and researchers. Although much research has been undertaken internationally in the field of deaf education, literacy development, and the utility of specific intervention programmes, the problem of poor literacy development continues to be problematic with these learners. There is a dearth of research on this topic within the South African context. Consequently, there is a pressing need to explore this topic further by implementing and evaluating programmes that may enhance the literacy development of deaf and hard-of-hearing learners. The intention of this study is to evaluate the efficacy of implementing the Teaching Handwriting, Reading and Spelling Skills Programme (THRASS) with an Intermediate Phase deaf Gauteng learner using the spoken language approach.

1.4.4 The research question

Based on the preliminary literature review and research undertaken in this field of study, the following research question may be posited from the research problem statement:

> **Will the implementation of the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme - which incorporates the use of a Phoneme Machine with a Cued Speech option - enhance the literacy levels of an Intermediate Phase learner who is deaf and who uses the spoken language approach?**

The following sub-questions which emerge from the primary research problem statement and research question are posed to explore the study further:

- What is the nature of deafness?
- What is the spoken language approach in contrast to other communication methods used by the deaf?
- How do deaf children acquire language?
- To what extent will the Teaching Handwriting, Reading and Spelling Skills literacy programme – which employs a phonographic method to support language acquisition at the Word Level – support the literacy development of an Intermediate Phase deaf learner who uses the spoken language approach?
- What part does Cued Speech - with particular reference to the Cued Speech option of the THRASS Phoneme Machine - play in supporting a deaf learner's ability to disambiguate phonics and facilitate access to the spoken word?
- What is the role of phonology in developing literacy skills of a learner who is deaf?

Once the research problem has been stated, the aims of the study coupled with the more specific research objectives clarify what the researcher hopes to achieve (Hofstee 2006:86).

1.5 AIM OF THE STUDY

The aim of this study is to explore and evaluate the implementation of the Teaching Handwriting, Reading and Spelling Skills (THRASS) literacy programme as a supportive intervention programme to address the literacy levels of an Intermediate Phase learner who is deaf and who uses the Auditory-Oral or spoken method of communication. In other words, this study seeks to determine the effect of this programme intervention.

In order to achieve this aim, the following specific research objectives will be considered in this study:

- To define and describe the concept of 'deafness'
- To consider the language and communication approaches used by the deaf
- To discuss the concept of deafness as it pertains to language acquisition and literacy
- To investigate and implement the THRASS literacy programme with a learner who is deaf in order to establish the utility of this programme in an inclusive setting and to gauge whether and how this programme may be used to support the literacy levels of this learner. Particular reference will be made in respect of the Phoneme Machine which incorporates the Cued Speech option to address the critical components of phonemic and phonological awareness in respect of literacy development. This will take the form of observations, interviews and data collection and analysis.
- To discuss the role of phonology in developing literacy skills of learners who are deaf. This will be in the form of a literature review.

The rationale and motivation for the study place the research undertaking in perspective and justify the necessity for embarking on this study. Although the primary aim is to evaluate the utility of a specific programme in attempting to enhance the literacy levels of a specific learner who is deaf and who uses a specific communication method, the researcher hopes that this study will provide a wealth of information to all current and potential educators of deaf learners.

With the increasing popularity of cochlear implants; early screening and intervention techniques; the growth in the number of learners who are deaf being included in mainstream schools; the integration of the THRASS Literacy Programme in Tertiary institutions and schools; and the National focus on literacy campaigns such as Foundations for Learning and the *Kha Ri Gude* Mass Literacy Campaign, educators need to be empowered with information derived from current

research and good educational practice.

1.6 ORIENTATION TO RESEARCH DESIGN AND METHODOLOGY

1.6.1 Paradigmatic perspective

This research is in keeping with naturalistic inquiry. This is a qualitative naturalistic approach used to acquire insight into phenomena by discovering both paradigmatic (fundamental beliefs and assumptions) as well as methodological (procedural and practical) meanings through our attempts to comprehend the whole. The terms Interpretivism and Constructivism have been used to accentuate the numerous dimensions of the naturalistic paradigm (Williams 2005:271). Interpretivism suggests that there are multiple realities of phenomena which may change across time and place (Neill 2006:2). Qualitative research is fundamental to a constructivist philosophy which assumes reality to be a multi-layered, collaborative, collective social experience within which individuals and groups may assign meaning or interpret events (McMillan & Schumacher 2006:315). Understanding the subjective world of the human experience, concern for the individual and focusing on action, interaction and shared experiences are the fundamental underpinnings of this paradigm (Cohen, Manion & Morrison 2000:21).

Within the qualitative research framework, the researcher will focus on one phenomenon, a literacy programme, as case study in order to acquire in-depth knowledge and insight into a specific bounded system or case, over time and in detail (McMillan & Schumacher 2006:316). The researcher is anticipating that changes will occur in the literacy achievement levels of the deaf learner as she interacts with the Teaching Handwriting, Reading and Spelling Skills (THRASS) literacy programme over a period of time. In order to quantify the changes that may occur in respect of literacy development, the launch and landing of this research undertaking will involve the administration of criterion-referenced and norm-referenced tests. The value of pre-tests is to establish a baseline assessment, and the post-tests will indicate any changes that have occurred after the literacy intervention.

1.6.2 Research design

Qualitative research designs, which may be interactive or non-interactive, involve the systematic collection and arrangement of data, in the form of words, on naturally occurring phenomena. Interactive qualitative methods employ face-to-face data gathering techniques in real-world, natural settings. A case study is an interactive qualitative research design which focuses on a particular lived experience over time and in depth (McMillan & Schumacher 2006:26). It is a

rigorous study of a particular person or a specific context and a combination of data collection methods may be utilised to conduct a case study (Trochim 2006:2). A qualitative, emergent, evaluative case study research design will form the framework of the investigation in order to gather and analyse multiple sources of data in a natural setting, using a variety of methods, until an in-depth understanding of the phenomenon - in this case a programme - is attained (McMillan & Schumacher 2006:26). Case study has been adopted as a method for instructional use in education and this method satisfies the three basic tenets of qualitative method: description, understanding and explanation (Tellis 1997:3-4). Although this research study is inaugurated and culminated with quantitative, numeral data, the bulk of the year-long study is qualitative in nature and focuses on the observation of emerging patterns of behaviour. This study evaluates the efficacy of an intervention programme as case, and evaluation research can be both quantitative and qualitative in nature (Check & Schutt 2012:10-12).

1.6.3 Data collection and analysis strategies

Research entails the methodical collection and analysis of data by means of reliable and valid techniques in order to investigate a research problem (McMillan & Schumacher 2006:9). In qualitative research design the phases of data collection and analysis strategies are inextricably linked (McMillan & Schumacher 2006:322). Strategies refer to the sampling and data collection methods which are systematically refined over time in order to increase validity (McMillan & Schumacher 2006: 322,340).

Multimethod strategies such as observation, limited participation, collaborative co-teaching, conducting interviews, artefact collection and field records will be used to enhance the trustworthiness of this study (McMillan & Schumacher 2006:341). The naturalist or interpretive paradigm is dominated by the research methods of interviews and observations (Golafshani 2003:600). Participant observation involves a researcher becoming immersed in the context being observed (Trochim 2006:1). Artefacts may include samples of written work in all areas of the language arts, various class assessments, pre-tests and post-tests, school reports, learner portfolios, learner profiles, as well as medical and paramedical reports.

The researcher will take on the role of participant as observer and collaborative co-teacher when the THRASS programme is being utilised within the classroom during the THRASS ‘15 minutes a day’ programme implementation with the group of learners, in order to collect and analyse data. However, the researcher will take on the primary role of educator when the research participant interacts with the Phoneme Machine and learns to cue because the researcher has attended a course on Cued Speech offered by Cued Speech South Africa (CSSA).

Although there is no specific set of standard procedures to follow when analysing data, the qualitative data collected will be systematically recorded, categorised and coded in overlapping phases by means of an inductive process, and at regular intervals, in order to determine emergent themes, patterns, relationships, similarities, differences and concepts (McMillan & Schumacher 2006:364-366). The inductive process in qualitative study commences when the researcher gathers information in the form of observations and interviews, asks questions of participants and records notes in the field (Cresswell 2003:132).

Both mechanical recording and note-taking are important methods of data collection. Mechanical recorders facilitate word-for-word accounts of interactions whereas notes may be used to record non-verbal communication and may act as a back-up in case the recording instrument malfunctions (McMillan & Schumacher 2006:355).

1.6.4 Validity and reliability

Validity is concerned with the degree to which the descriptions of the phenomena and the realities of the world correspond (McMillan & Schumacher 2006: 324). Credibility refers to the results of the research being judged as being credible or legitimate from the perspective of the research participant (Trochim 2006:11). To ensure the validity and credibility of this study the researcher will make use of multi-method strategies such as prolonged direct observation, cooperative co-teaching, interviews, artefact collection and field records (McMillan & Schumacher 2006: 324).

Transferability or generalisability refers to the manner in which the knowledge gained from this particular study may be generalised across different people, settings, or time as in quantitative research (Trochim 2006:11). The researcher intends to give an in-depth, ‘thick’ description and definition of all aspects related to this study in order to contribute to a body of knowledge and assist in the transfer of this knowledge to other similar settings.

Dependability refers to the consistency of the findings and confirmability is concerned with the extent to which the outcomes of the study may be corroborated (Trochim 2006:12). In order to avoid researcher bias and establish dependability and confirmability the researcher will make use of peer assessment and debriefing or ‘auditing’. (McMillan & Schumacher 2006: 326; Trochim 2006:12).

1.6.5 Ethical considerations

Since qualitative research intrudes on the lives of all participants, certain guiding principles with regard to informed consent, deception, confidentiality, anonymity, privacy and caring must be adhered to. Qualitative researchers must prepare in advance how they intend to deal with potential ethical dilemmas in interactive data collection. The general reading public should not be able recognise either the settings or the participants. For this reason, researchers characteristically code the names of people and places by making use of pseudonyms (McMillan & Schumacher 2006: 333-334). Thus, for the purposes of this study the research participant will be referred to as Sally.

1.7 EXPLANATION OF RELEVANT CONCEPTS

The following concepts have been defined in order to provide the reader with a background to the terminology used throughout this research.

CONCEPT	EXPLANATION
Articulation	This refers to the physical production of speech sounds by adjusting the flow of air from the lungs through the movable articulators of the lips, mandible, soft palate , larynx and pharynx and the immovable articulators of the teeth, alveolar ridge and hard palate (Haynes, Moran & Pindzola 2006:54).
Articulatory feedback	A system combining mouth movements with voiced and unvoiced vocal sensations to represent each phoneme. This tactile-kinaesthetic feedback system relies on the association between how phonemes feel on the mouth and in the vocal tract to the grapheme correspondence (LaSasso, quoted in Trezek et al 2010:54).

Auditory-Oral (O-A) or aural-oral approach	This approach to spoken language development permits the use of speech reading combined with residual hearing augmented by amplification technology such as hearing aids or cochlear implants to facilitate both the reception and the expression of spoken language (Marschark 2009:87). This approach falls within the oralist philosophy and may be referred to as oralism
Auditory-Verbal (O-V) approach	This approach to spoken language development centres around increasing listening skills (audition) and decreasing the use of speech reading (vision) so that children make use of residual hearing without making use of visual cues to support language comprehension (Marschark 2009:87).
Bilateral	In respect of hearing loss or cochlear implants, the word '*bilateral'* refers to the involvement of both ears, whereas '*unilateral'* would refer to one ear only.
Cochlear implants or units	Assistive listening devices which comprise of a microphone, a speech processor, a transmitter, an internal receiver and an electrode array working together to augment sound by directly stimulating the auditory nerves of the inner ear. These devices can be fitted unilaterally, meaning in one ear, or bilaterally, meaning in both ears (Harkins & Bakke 2003:414).
Conductive hearing loss	This occurs when the transmission of sound vibrations through the middle ear is obstructed due to blockage of the ear canal or damage to the eardrum or the ossicles, thus restricting the volume or intensity of sound heard (Marschark 2009:33).
Constructivism	The constructivist paradigm encompasses interpretivist philosophy because it highlights how various stakeholders in educational settings construct their belief systems (Check & Schutt 2012:15).
Co-teaching	Involves two or more educators sharing the responsibility of teaching all or some of the learners in a group or classroom. The responsibility for planning, preparation of lessons, strategies for instruction and evaluation are distributed between or among the teachers involved.

Cued Speech	Cued Speech is primarily a language or communication approach used to support the development of spoken language in learners who are deaf or hard-of-hearing. A system of visible sound-related hand shapes and non-manual cues are utilised to afford a greater accessibility to the phonology of a language (Paul 2009:131).
Graphemes	Graphemes are the printed letters or symbols used to represent sounds or phonemes (Spencer & Marschark 2010:88).
Implementing	To put into effect by following a specific plan or procedure. This term is used in this study to refer to implementing the THRASS programme (Dictionary.com nd. Unabridged).
Inclusion	Accommodating and addressing the full range of learners needs by adapting and modifying teaching strategies and resources to meet the diverse needs of all learners within one educational environment or an inclusive education setting. The research site is a small, inclusive, independent school.
Independent School	Independent Schools are also known as private schools. These schools are privately governed and may or may not receive limited financial support from local or national government.
Integration	Special services are provided to learners who experience barriers to learning and who are integrated into mainstream school settings (Swart & Pettipher 2007:7).
Intermediate Phase	This refers to the categorisation of learners according to the Department of Education. An Intermediate Phase learner within the South African context is a learner who is in Grade 4 to Grade 6.
International Phonetic Alphabet (IPA)	A system of phonetic notation based on the Latin alphabet to represent the phonemes of a spoken language and aid pronunciation (Trezek et al 2010:209).
Interpretivism	From an educational perspective, Interpretivist philosophy embraces the idea that reality is socially constructed, and the aim of educational research is to comprehend the meanings that people assign to reality (Check & Schutt 2012:15).
Least Restrictive Environment	This refers to the placement of a learner in an educational setting where all the learner's diverse educational needs may be met.

Learner who is deaf	This refers to a child within an educational context who has a 'hearing loss' as seen from an audiological perspective.
Literacy	Literacy refers to the ability to listen, speak, read and write, think and reason in a specific language. In this study a specific programme will be implemented in order to improve literacy skills.
Literacy Programme	This refers to any programme designed to support the development of literacy skills in learners to enhance their ability to listen, speak, read, write, think and reason.
Mainstream	The learner in a mainstream setting is expected to 'fit in' to the existing educational setting, which remains largely unchanged, and does not generally provide additional support (Swart & Pettipher 2007:7).
Manualism or the manualist approach	This approach to language development is centred on the visual-gestural modality. It is a sign language approach that emphasises the use of natural sign language as the first and barrier-free language of the Deaf. The spoken language of the hearing majority is considered the second language of the Deaf learner. Thus, this approach, which falls within the manualist philosophy, may be referred to as manualism (Storbeck 2007:354).
Meta-cognitive strategies	These are strategies used to enhance a learner's awareness of his/her own unique thought processes. Meta-cognitive knowledge develops as learners learn about reading and writing processes and the strategies that are used when reading and writing (Dednam 2007:120-121).
Metalinguistics	Metalinguistic awareness evolves from the understanding of the phonological, syntactic and semantic dimension of language (Dednam 2007:120-121). The first phase, being phonological awareness, is a core element in this study.

Morphology	This component of language deals with morphemes. A morpheme is the smallest unit of language that conveys meaning. Bound morphemes are attached to other morphemes and included plural and tense-markers, prefixes and suffixes (e.g. man*ly*. Unbound or free morphemes have meaning on their own (e.g. man) (Haynes et al 2006:44). Thus, morphology deals with the internal structure of words (Trezek et al 2010:210).
Multi-sensory learning	This involves learning through a combination of senses by listening to the sounds (auditory modality), seeing the symbols associated with the sounds (visual modality), writing the sounds or drawing shapes in, for example, the sand (tactile learning) and even physically moving around the enlarged shapes of the symbols (kinaesthetic learning). It is a 'hear, see, do' strategy used in teaching also known as the 'VAKT' method.
Oralism	(See Spoken language approach)
Orthography	Orthography is largely concerned with the mapping of sounds or phonemes to their related symbols or graphemes in a language. Other elements that may be considered part of orthography include hyphenation, capitalisation, word breaks, emphasis, and punctuation. Orthography thus describes or defines the set of symbols used in the printed words of a language, and the rules about how to use those symbols according to set spelling rules. (Wikipedia. The Free Encyclopedia 2012).
Phonemes	Phonemes are the smallest units of speech sounds specific to any language (Spencer & Marschark 2010:88). For example, the word '*cheese'* consists of three distinct phonemes, namely '*ch', 'ee' and 'se'.*
Phonemic awareness	Phonemic awareness refers to the ability to hear, identify, combine and manipulate phonemes according to rules in order to produce words and sentences. According to the National Reading Panel phonemic awareness is considered to be one of five prerequisite components of reading instruction. (Spencer & Marschark 2010:88).

Phonics	This involves the ability to follow rules in order to associate or map sounds (phonemes) with the symbols or letters (graphemes) that represent those sounds (Spencer & Marschark 2010:88). Knowledge of phonics is deemed an essential component of reading instruction by the National Reading Panel.
Phonology	This refers to the speech sound production of words in any language. It encompasses speech sound perception, representation and production as well as the prosodic elements of intonation, stress, timing, and the articulatory units of syllables and phonemes (Trezek et al 2010:211).
Programme	A plan, a procedure, a syllabus or a curriculum. In this study a programme refers to a procedure to be put in place to support literacy development (The Free Dictionary. [n.d.]).
Prosodic	Prosodic elements refer to the suprasegmentals of a language which are intonation, pitch, rhythm, stress, timing and pause as opposed to the segmentals of a language which are the phonological elements of consonants and vowels (Paul 2009:19).
Sensorineural hearing loss	This occurs when damage to the cochlea or the connections to the auditory nerve prevent the conversion of sound vibrations into electrical signals for interpretation by the brain via the auditory nerve. Whereas conductive hearing losses impede the transmissions of sound vibrations through the mechanisms of the middle ear to the inner ear, sensorineural hearing losses involve the inner ear mechanisms (Marschark 2009:33; Storbeck 2007:352).
Spoken language approach	This educational practice in respect of deaf or hard-of-hearing children embraces the philosophy of oralism. This approach advocates a fusion of speech reading, residual hearing with the aid of amplification technology such as hearing aids or cochlear implants, and the use of spoken language as the method of communication.
Specialised education environment	In the context of this study a specialised education setting would be one where experts or specialist educators would support the learner who is deaf in, for example, a school for the Deaf

Synthetic phonics	This refers to the bottom-up approach in teaching reading where the emphasis lies in developing knowledge of how phonemes (basic units of sound) are mapped with specific graphemes (letter symbols) and blended together (synthesized) to form words. This is Word Level teaching.
THRASS	Teaching Handwriting, Reading and Spelling Skills (THRASS) programme which is centred on the synthetic phonics approach. (THRASS. n.d.).
Visual Phonics	A multisensory system consisting of 46 hand cues correlated to written symbols that represent the phonemes of a language and the phoneme-grapheme correspondence. The hand cues are near the mouth and are used in synchronicity with spoken language (Trezek, Wang & Paul 2010:56-57).

1.8 CHAPTER OUTLINE

The research consists of six chapters which are briefly outlined below:

Chapter One provides an introductory orientation, an overview of the research and a statement of the problem. The rationale and motivation for the study; problem formulation; the aims of the study; the research design and methodology; an explanation of relevant concepts together with a brief outline of the chapters in the study all serve to place the study in perspective and orientate the reader to the nature and purpose of the study.

Chapter Two presents a theoretical framework in the form of a literature review in order to provide the reader with the additional, factual background knowledge which is pertinent to the study. The concept of 'deafness' is defined and described, the language and communication approaches used by the deaf and hard-of-hearing are discussed, and past and current practices in 'deaf' education are reviewed both internationally and within the South African context. The concepts of inclusion and inclusive education within the national and international arena are examined, and the chapter culminates with a discourse centred on the concept of deafness as it pertains to language acquisition and literacy.

Chapter Three comprises an exposition of the Teaching Handwriting, Reading, and Spelling Skills (THRASS) programme, together with a description of the different approaches to phonics instruction. The chapter concludes with a debate on the efficacy of employing a phonological approach when teaching literacy skills to learners who are deaf.

Chapter Four offers an explanation of the research paradigm in which this study is framed, with reference given to both quantitative and qualitative design methodology. The research design which underpins this study is described, with the emphasis centred on case study design. Background information in respect of the research participant and the researcher is proffered, and the research strategies of data collection, data processing and analysis are presented. The chapter concludes with an explanation of the concepts of validity and reliability as well as ethical considerations.

Chapter Five revolves around the analysis, interpretation and discussion of findings as they emerge from the data in the different phases of the research. An in-depth error analysis in respect of speech sound production, reading and spelling is submitted for each phase of the study, and a discussion of the outcomes of these findings forms the conclusion of this chapter.

Chapter Six concludes the entire research report by drawing on key information presented in each preceding chapter in order to summarise the research findings and discuss themes that emerged from the literature and the findings. The utility of the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme will be reviewed and recommendations relating to the findings will be suggested. The limitations of the study will be tendered, and proposals for future possible research will be outlined before a final conclusion is penned.

1.9 SUMMARY OF CHAPTER ONE

This chapter has been critical for orientating the reader to the study which focuses on the implementation of the teaching Handwriting, reading and Spelling Skills (THRASS) literacy programme with an Intermediate Phase learner who is deaf and who uses the spoken language approach. The statement of the research problem has provided a link to the rationale for, the motivation behind and the aims of the research. Relevant concepts were briefly explained in order to provide a theoretical framework which underpins the study, and an outline of the research design and methodology has been put forward. This chapter has concluded with a brief summary of the chapters to be included in the dissertation.

CHAPTER TWO

DEAFNESS, EDUCATION FOR THE DEAF, AND LANGUAGE ACQUISITION, WITH REFERENCE TO INCLUSIVE EDUCATION

"*Deafness is difficult to define; there is no God's-eye view of deafness"* (Paul 2009:27).

2.1 INTRODUCTION

The purpose of this chapter is to acquaint the reader with a summary and analysis of the most current literature that pertains to the investigation. This research undertaking aims to evaluate the efficacy of the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme in supporting the literacy levels of a deaf Intermediate Phase learner who uses the spoken language approach. A well-structured literature review is paramount to understanding the significance of the research problem; to providing the reader with the theoretical, contextual framework which underpins this study; and it supports the placement of the results into perspective (Hofstee 2006:91; McMillan & Schumacher 2006:75).

2.2 A DEFINITION AND DESCRIPTION OF DEAFNESS AND HARD-OF-HEARING

Deafness generally refers to a physical, irreversible, invisible disability in terms of impairment in the function of the anatomical mechanisms involved in the hearing process as read during an audiometric procedure (Moores 2001:10). Defining the concept 'deafness' audiologically and as a physical disability is based on the medical model or within-child model which implies a 'handicap', a 'defect', an 'impairment' or a 'deficiency'; something that is 'wrong' and needs to be 'fixed up' (Swart & Pettipher 2007:5). Although there has been confusion and controversy surrounding the use of terminology to describe deafness, terms such as 'impairment', 'handicap' and 'disability' are considered derogatory and should be avoided (Moores 2001:10). In its uncapitalised form the term 'deafness' is generally accepted as referring to a lack of hearing in medical terms from an audiological perspective. However, the sociocultural term 'Deaf' bears reference to the linguistic minority who belong to the Deaf community, sharing common social structures, principles and viewpoints, who use natural sign language as their key means of communication and who distinguish themselves as Deaf people belonging to a shared Deaf culture (Marschark 2009:8-9; Marschark & Spencer 2003:viii).

Generally speaking, 'hard-of-hearing' is a term associated with hearing loss which refers to individuals who still have some degree of functionality of the auditory channels to access sound

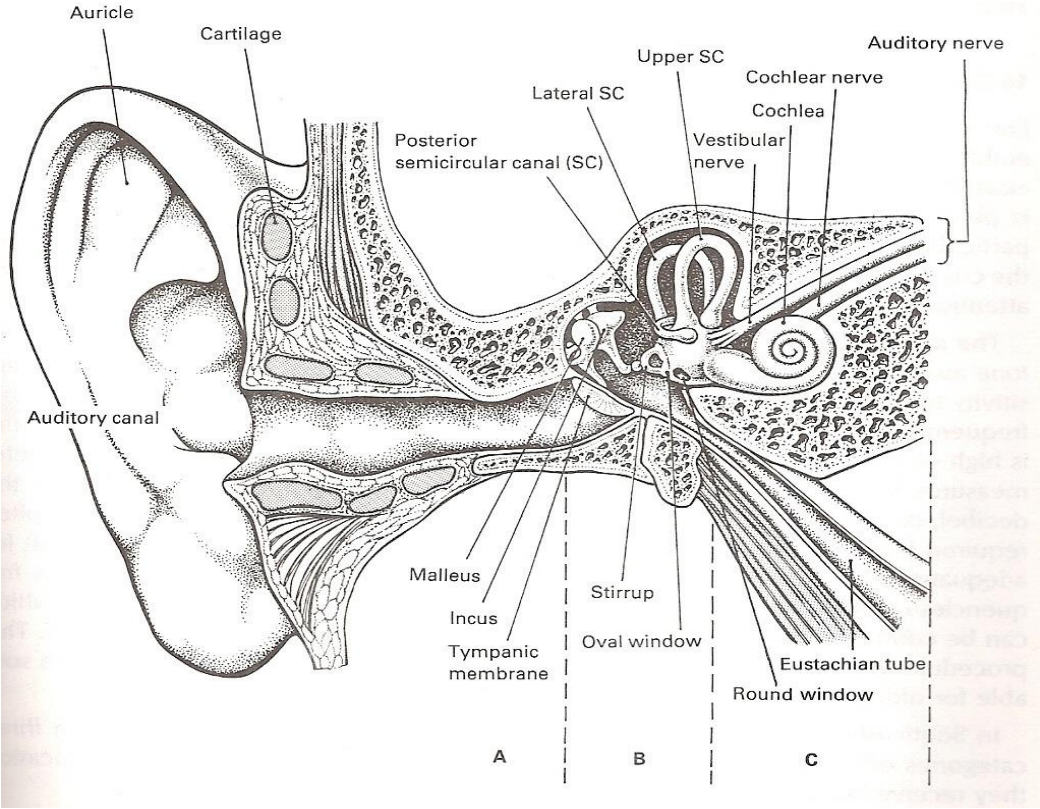
such as in mild to moderate hearing loss, as opposed to individuals who are 'deaf' and whose auditory channels are totally non-functional such as in severe or profound hearing loss (Marschark 2009:35; Moores 2001:10-11). The problem with these definitions is that hearing loss presents on a continuum and cannot, therefore, be categorised into discrete levels. Additionally, the category of 'deafness' as defined in an unaided audiogram may bridge over into the category of 'hard-of-hearing' with the aid of assistive devices. Thus, two people may have the identical audiogram reading, but the person with the assistive device and who speech reads could be classified as 'hard-of-hearing' whereas the person who signs and has no access to technological support is classified as 'deaf' (Marschark 2009:35; Moores 2001:10-11).

The concept of deafness, therefore, needs to be approached on a more functional level and cannot merely be diagnosed and defined solely on the basis of an unaided audiometric test or audiogram. Factors such as age of onset of hearing loss, aetiology, family environment, life-world experiences, intervention programmes, mode of communication, types of assistive devices used as well as age of fitting, category of hearing loss and possible co-morbid developmental disabilities are paramount when viewing 'deafness' from a developmental and educational perspective (Moores 2001:10; Power & Leigh 2003:39). This is in keeping with the bio-ecological model which considers the many interrelated environmental, contextual, social and systemic factors that influence a child's development, both directly and indirectly, in addition to the medical diagnosis of 'deafness' (Swart & Pettipher 2007:10).

In order to gain insight into the concept of 'deafness' in terms of loss of normal hearing from a medical perspective, it is pertinent to gain an understanding of the anatomical structure of the ear and the mechanisms of hearing; the classification, aetiologies and degrees or levels of hearing loss; the age of onset of hearing loss; the implications of hearing loss and the use of assistive devices and amplification technology. This background knowledge is relevant to the study because it will help the reader understand the various factors that play a pivotal role in the social, language and educational development of the learner in question as she is profoundly deaf. The research participant, who became deaf after contracting pneumococcal meningitis at the age of 20 months, is fitted with bilateral cochlear implant devices. She uses the spoken language approach with the aid of residual hearing augmented by these assistive devices and speech-reading. She does not make use of either natural or artificial signing systems.

2.2.1 The structure of the ear and the mechanisms of hearing

Figure 2.1 Structure of the Human Ear



The ear consists of three parts:

A The external ear

B The middle ear and

C The inner ear

(*Source*: Kapp 1999:321)

The anatomical components of the ear as the organ of hearing are the outer ear, also known as the auricle or pinna, the middle ear and the inner ear. The function of the outer ear is to collect sound vibrations in the air from the surrounding environment and channel these acoustic vibrations through the external auditory canal (external acoustic meatus) towards the eardrum or tympanic membrane, causing it to vibrate in response to the change of pressure. The sound vibrations are then transmitted behind the tympanic membrane to the middle ear; the latter comprising three bones or ossicles namely the hammer (malleus), the anvil (incus) and the stirrup (stapes). These vibrations in the middle ear set off movement in the ossicles thus transforming the sound vibrations into mechanical vibrations which, in turn, transmit the waves through the membranous oval window to the inner ear. The inner ear is the sensory-neural receptor organ which contains the vestibular system and the cochlea. The vestibular system is comprised of

three semi-circular canals, the utricle and the saccule which all serve to regulate balance and maintain equilibrium. The cochlea is a snail-like shaped sensory organ located in the bony labyrinth of the temporal bone. It mediates sound perception by transforming sound pressure impulses into electrical impulses which reach the brain via the auditory nerve. The cochlea is divided into three fluid-filled sections separated by membranous tissue, and it contains the basilar membrane which is a soft tube housing the sensory cell receptors that pick up sound. The organ of Corti, which is located on the basilar membrane in one of the fluid-filled sections of the cochlea, contains approximately 20,000 sensory hair cells divided into four rows. When pressure variations in the cochlea - initiated by sound impulses traveling down the tympanic and vestibular canals which contain a fluid called perilymph - occur, the mechanical vibrations cause the oval window to move back and forth. This sets off wave-like motions in the perilymph and these motions are transferred to the endolymph which surrounds the sensitive organ of Corti in the cochlear duct. The outer spiral of the cochlea responds to lower frequencies and as the cochlea coils inwards it responds to increasingly higher frequencies. The basilar membrane, which houses the organ of Corti, rubs against the tectorial membrane and these mechanical movements create a shearing force on the hair cells which, in turn, stimulate the nerve endings to transform the vibrations into electrical impulses. These electrical impulses travel along the auditory nerve to the temporal lobe of the brain for processing and interpretation (Arnos & Pandya 2003:395-396; Marschark 2009:31-32).

2.2.2 Classification and aetiologies of hearing loss

Whether due to illness, accident or hereditary factors, the type of hearing loss is categorised according to the section of the hearing mechanism that dysfunctions. Unilateral hearing loss involves one ear and bilateral hearing loss involves both ears. A similar loss in both ears is described as symmetrical whereas a different loss in each ear is termed asymmetrical. The following four types of hearing loss may be distinguished:

- Conductive hearing loss is caused by a disruption or interference in the flow of sound vibrations in either the outer or the middle ear. Possible causes may include blockage of the auditory canal (wax build-up) or the Eustachian tube; foreign objects in the auditory canal; secretory otitis media (infection of the fluid in the middle ear behind the tympanic membrane); congenital malformation such as occlusion of the auditory canal; perforated eardrum or damage to the ossicles due to trauma, infection or otosclerosis (hardening of the ossicles). Conductive hearing loss is generally attributed to middle ear disorders with a resultant effect on audibility of sounds heard - this is the intensity or volume of sound perception which is measured in decibels (dB) and this loss is generally the same on all frequencies which is measured in Hertz (Hz). Hearing may be restored through medical,

surgical or amplification interventions. However, severe and repeated bouts of otitis media may lead to permanent hearing loss (Haynes, Moran & Pindzola 2006:290-292; Mahshie, Moseley, Scott & Lee 2006:20; Marschark 2009:32-33; Storbeck 2007:352).

- Sensorineural hearing loss, which may be either congenital or acquired, is a permanent hearing loss as a result of neural damage to the cochlea of the inner ear or the connections to the auditory nerve and/or the brain stem. Although the outer and middle ear may function normally the inner ear cannot convert the acoustic vibrations ('sensory') into electrical impulses for transmission via the auditory nerve ('neural') to the brain for interpretation (Mahshie et al 2006:20; Marschark 2009:33; Storbeck 2007:352). Sensorineural hearing loss may only affect a particular range of frequencies because the various structures of the inner ear respond to different frequencies (Haynes et al 2006:292). Causes of sensorineural hearing loss may include meningitis (bacterial meningitis in particular), maternal illness such as German measles or rubella, or cytomegalovirus or herpes virus (CMV), trauma, exposure to extreme noise levels, Down's syndrome, drug usage, prematurity, anoxia (lack of oxygen) or heredity factors. Sensorineural hearing loss affects both the audibility and intelligibility (discrimination of individual speech sounds) of speech sounds on certain frequencies making it extremely difficult or even impossible to understand speech, and people with this disorder cannot hear themselves speak. Amplification in the form of hearing aids or cochlear implants together with speech-reading may improve residual hearing , but auditory distortion may still be present (Mahshie et al 2006:20; Marschark 2009:33; Storbeck 2007:352).
- Mixed hearing loss occurs as a combination of conductive and sensorineural hearing loss. For example, a person with sensorineural hearing loss may also suffer from frequent bouts of otitis media with the result that amplification technology cannot be used due to the middle ear infection which first needs to be treated medically (Mahshie 2006:20).
- Central hearing loss is also known as central auditory processing disorder (CAPD). Although the structure and mechanisms of the ear are intact, the brain is compromised in its ability to interpret or process the information received due to damage to the auditory cortex and/or other auditory centres of the brain involved in sound interpretation. Thus CAPD is not an audiological disorder, but it is a neurological disorder. This neural damage may be a result of anoxia, trauma, diseases, prematurity or drugs – this condition is sometimes 'misdiagnosed' as Attention Deficit Disorder Syndrome in learners. Amplification technology or direct treatment may help to support communication (Mahshie et al 2006:20; Storbeck 2007:352).

The research participant contracted pneumococcal (bacterial) meningitis at the age of 20 months – a critical time for acquiring the rudiments of language - resulting in bilateral, profound *sensorineural* hearing loss. Her hearing thresholds are slightly worse in the left ear indicating an asymmetrical hearing loss which is still evident on current audiological readings taken with her bilateral implants. She also suffered frequent bouts of otitis media for a few months after her attack of meningitis. It must be noted that the degrees or levels of hearing loss will affect the ability to discriminate speech sounds and the loss of speech sounds will have a direct and pervasive impact on a child's ability to acquire language. These aspects will arise later in the study.

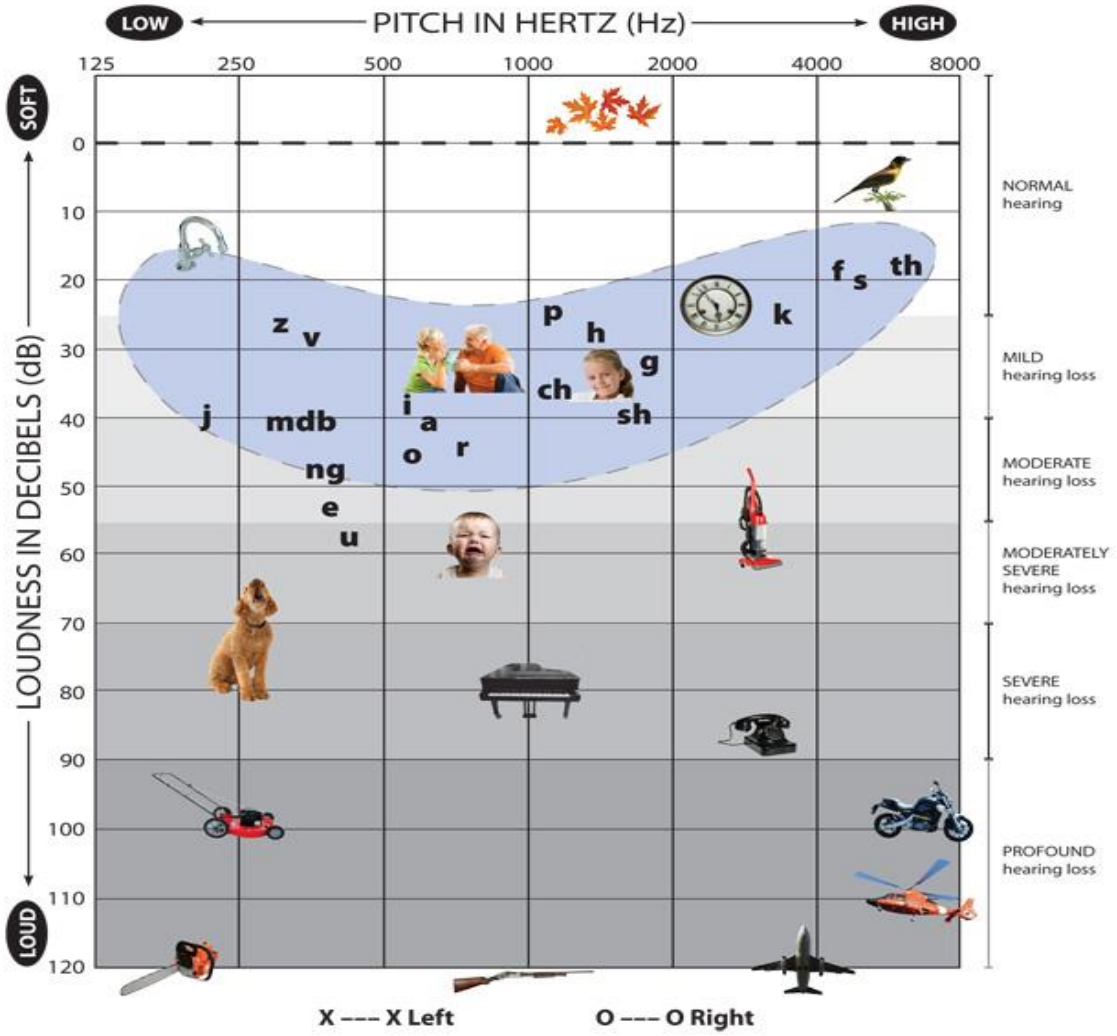
2.2.3 Degrees or levels of hearing loss

The different types of hearing loss will affect the audibility and intelligibility or clarity of sounds on different frequencies. These levels or degrees of hearing loss are based on the measurement of pure tone hearing threshold which is the lowest intensity or volume at which a child or an adult person with normal hearing may detect sound in any specific range of frequency at least 50% of the time. The level of hearing loss is calculated on an average based on 5 separate frequencies in the better ear (Brown 2006:12). The higher the pure tone threshold reading is, the louder a sound must be in order to be heard and the more severe the loss is, the lower the graph will be plotted on the audiogram (Watson, Gregory & Powers 1999:3). The loss of intensity varies across frequencies although the impact is generally greater on higher frequencies. The intensity or loudness of sound perception is measured in decibels (dB) and the hearing level results are plotted on an audiogram on the vertical *y* axis in the range 0-120 dB from the softest sounds at the top of the audiogram to the loudest sounds at the bottom. The frequency, which is perceived as the low or high pitch of sounds is measured in Hertz (Hz) on the *x* axis in the range 125-8000 cycles per second from the lowest to the highest pitch. (Haynes et al 2006:288; Marschark 2009:34; Storbeck 2007:351).

Figure 2.2 below shows familiar environmental sounds such as leaves rustling, dogs barking, aircraft flying overhead and speech sounds and the positions of these sounds on the audiogram in terms of volume and pitch. Of particular significance for a child with hearing loss is the placement of the various speech sounds in terms of pitch and volume in what is called the 'speech banana', bearing in mind that normal conversational speech is about 45 dB (Brown 2006:12). Consonant sounds of speech are predominantly high in frequency and since consonants carry most of the speech information, a learner with a high frequency hearing loss may miss many essential parts of words and this will manifest in significant problems with speech reception and speech production (Watson et al 199:3). Consonants also act as breaking points,

separating syllables and words from one another. Consonants are spoken more softly in terms of intensity with the result that they tend to get drowned out by background noises. Additionally, consonants are higher pitched than vowels and there is a tendency for hearing loss to increase at higher frequencies (Hound Dog Hearing 2002; Ross 2004:30-31). It is pertinent to note that the voiceless 'th' [θ] sound is the weakest sound in the English language and the 's' is the most frequently used phoneme in the English language (Ross 2004:30).

Figure 2.2 Audiogram of familiar sounds



(*Source:* Mt. Scott ENT. Audiogram of familiar sounds 2011).

Table 2.1 below classifies the degrees or levels of hearing loss in decibels and in terms of the effects these levels of hearing loss may affect the ability to communicate, bearing in mind that communication is key to language acquisition. There are strong correlations between the degree of hearing impairment and speech development (Paul 2009:138).

Table 2.1: Degrees of hearing loss

Degrees in decibels (dB)	*Classification of hearing loss*	*Effect on communication*
0-15 dB	Normal hearing	N/A
16-25 dB	Slight hearing loss	Can't hear speech if someone is far away or there is background noise. Problems with clarity and hearing morphemes in tenses and plurals at the end of words e.g. work(ed); king(s).
26-40 dB	Mild hearing loss	May lose 26-40% of speech signal. Battles to hear soft voices or distant speech even if there is no background noise. May lose up to 50% of information in class discussions.
41-55 dB	Moderate hearing loss	May lose 41-55% of speech signal. May hear normal speech at short distances or face-to-face. Potential delays in speech production, syntax and lexical knowledge.
56-70 dB	Moderately severe hearing loss	May lose 56-70% of speech signal. Only hears loud conversation at close range. Battles to follow classroom discussions. Increasingly reliant on visual cues. Possible significant language development delays and speech production deficits.
71-90 dB	Severe hearing loss	May lose 71-90% of speech signal and therefore cannot hear normal conversations. Must be spoken to directly, loudly and at close range. Global language delays. Will require early intervention.
>90 dB	Profound hearing loss	91% + loss of speech signal. Relies on visual cues (sign language, speech-reading) as communication tools. Language development delay and intelligibility difficulties.

(*Source:* Adapted from Flexer 1994; Northern & Downs 1991; and Stach 1998, in Haynes et al 2006:289).

The degrees of hearing loss are more specific than using the broad categories of 'hard-of-hearing' or 'deaf'. However, it would be imprudent to evaluate the potential of learners based on their threshold scores alone because some learners with profound hearing loss may be able to speak, speech-read and interact more successfully in the learning environment than learners with less severe forms of hearing loss. This is because the degree of hearing loss and the effects of this loss on the ability to communicate effectively are also dependent on other factors, one of these being the age at onset of deafness. This is a very critical linguistic factor, particularly for educators (Haynes et al 2006:290).

In an unaided condition (without the cochlear external processors in place) the research participant's pure tone auditory threshold reading indicated a profound hearing loss of 100dB or more in both ears, with the left ear showing a higher loss than the right ear. Even with the aid of bilateral cochlear implants and speech-reading, there are certain frequencies of speech sounds which are difficult for the research participant to discriminate. These aspects will be expounded upon later in the study.

2.2.4 Age of onset

Age of onset refers to the time in a person's life when the hearing loss occurred. If deafness is present at birth (congenital) or arises prior to the development of speech and language (acquired) it is termed *prelingual* deafness. Since neonates (newborns) have not acquired language, they may be considered prelingually hearing or prelingually deaf. *Postlingual* deafness refers to loss of hearing after the acquisition of spoken language (Moores 2001:12). Prelingual deafness will have a more profound impact on the development of spoken language than a hearing loss incurred after the age of about 2 years, and this will have negative implications with regard to academic performance (Haynes et al 2006:290).

Werker (2007), a developmental, cognitive neuroscientist states that because the inner ear is fully developed by the 20th week of gestation, the infant's brain will have received approximately 20 weeks of sound experience *before* birth. This implies that an infant who suffers hearing loss in the crucial embryonic stages will be 20 weeks behind in receptive language experiences at birth (Robertson 2009:45). This is in contrast to the statement made by Moores (2006) that neonates have not acquired language.

The research participant lost her hearing postlingually at the age of 20 months. At this age children are generally putting together two or three-word phrases. When she started at a Centre for Language and Hearing Impaired Children at the age of 4, the research participant had no

expressive oral language; neither was she using any form of sign for communication.

2.2.5 Implications of hearing loss

Spencer and Marschark (2010:4) contend that "it is important to recognise that the deaf and hard-of-hearing (DHH) children in school today are different from those we were educating only a decade ago" largely because of early intervention programmes and the increased use of vastly improved assistive devices and amplification technology. However, childhood hearing loss still places any child "at high risk" with regard to language, social and educational developmental outcomes (Spencer & Marschark 2010:16). Haynes et al (2006:293) concur by suggesting that learners who are DHH not only have to contend with problems of an academic nature, but also with problems of a societal nature because people may tend to be tactless, unaware and ill-informed or even biased in their dealings with these learners.

The high incidence of academic challenges and delays in DHH learners is mostly due to the complexities of language acquisition and their subsequent poor performance in the print literacy skills of reading, spelling and writing. Even a slight hearing loss of between 16-25dB can have implications for overall academic achievement, and the longer this hearing loss goes unidentified the more significant the impact on the levels of development (Spencer & Marschark 2010:5,10,16). Although early intervention programmes will not remove the problem faced by DHH children in acquiring language skills, these interventions will enhance their ability to achieve a higher level of spoken or signed language competence (Spencer & Marschark 2010:20,42).

Academic delays in the subject areas of mathematics and science are also evident in children who are DHH because they lack the necessary content-specific and general vocabulary, thus decreasing the opportunities for incidental learning. These gaps in knowledge are evident even before formal schooling begins and this is exacerbated by the fact that fundamental concepts and ideas cannot always be expressed by signs (Spencer & Marschark 2010:151).

Brown (2006:43) contends that the following factors may result in children with permanent hearing loss being unable to acquire numeracy skills successfully:

- Insufficient access to incidental mathematical learning in the pre-school years
- Reduced auditory input effects short-term memory skills, thus increasing the response time for tasks involving basic operations
- Mathematical language is challenging due to the 'complexity of mathematical semantics and syntax'

- Classical numeracy lessons are at too vigorous a pace for children to 'tune in' to lesson content and assimilate information
- The names of certain numbers are phonographically similar and may cause confusion (e.g. 16 and 60 sound similar and have indistinguishable lip patterns).

Coupled to this is the problem of parents being inadequately experienced or knowledgeable regarding the support and accommodation of their child's levels of development and language needs - bearing in mind that up to 90% of children who are DHH have hearing parents (Spencer & Marschark 2010:16). The learner in this study has hearing parents.

Children who are DHH may also be 'at risk' in the social-emotional and behavioural arena because of their inability to communicate effectively at home or outside of their family settings, particularly if a deaf child has a hearing family. This may lead to low self-esteem, feelings of neglect and isolation, and difficulties with social interaction (Spencer & Marschark 2010:18-19). However, deaf children from deaf families appear to be more confident socially because these children generally interact with other DHH individuals in various settings (Marschark 2009:208).

An increasingly large percentage of children who are DHH are also being diagnosed with co-morbid learning, behaviour and attention, visual, developmental and motor impairments or disabilities. Between 5% and 25% of deaf children present with co-morbid learning disabilities, and medically related factors overall affect 30-40% of deaf children. A visually impaired child may battle to speech-read or sign-read resulting in a reduction of potential language input; a child with motor impairments may require alternative and augmentative communication methods; a child with a specific learning barrier may be unable to pay attention to or remember fundamental language skills; a child with a cochlear implant may not progress as expected due to additional learning disabilities (Spencer & Marschark 2010:14-15; Marschark & Hauser 2012:142). The co-morbidity of deafness with other barriers to learning "does not merely add to an individual's problems; it compounds them exponentially" (Moores 2001:139).

School placement is another issue that needs to be resolved with regard to children who are DHH because they can either be integrated in general education settings or in specialised schools, although no research evidence has proved the superiority of one placement over the other (Spencer & Marschark 2010:153,168). Decisions regarding educational placement would also hang on the choice of communication modes adopted by the DHH and the possible use of assistive devices and amplification technology to facilitate access to sound.

2.2.6 Assistive devices and amplification technology

Considerable advancements have been made over the last three decades in the field of visual technologies, sound amplification technologies, and digital processing technologies to directly stimulate the cochlea and enhance communication levels in the deaf and hard-of-hearing (DHH). This rapid evolution of "data processing power, miniaturization, and digitization of analog technologies," has resulted in greatly increased access to both visual and auditory communication channels (Harkins & Bakke 2003:406, 412).

2.2.6.1 *Hearing aids*

The hearing aid is generally the first item of technology to be prescribed for the rehabilitation of sensory hearing loss involving the reduced intensity or volume of sound because it augments sound reception and alters acoustic input by amplifying auditory signals higher than the pure tone hearing threshold of the user, thus acting as an individualised public address system. In other words each hearing aid must be calibrated to the individual's hearing loss configuration across the sound frequencies which are fundamental to producing clarity of speech sounds (Brown 2006:31; Harkins & Bakke 2003:412). For the majority of children who are deaf or hard-of-hearing (DHH), a hearing aid is an essential tool for scaffolding their "habilitation and education" (Haynes et al 2006:300).

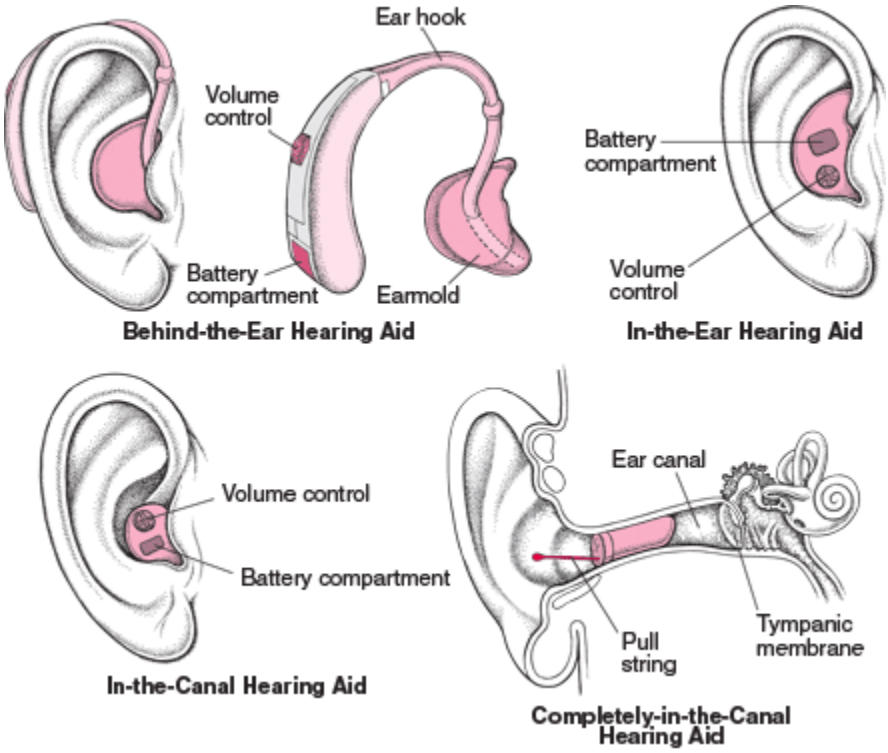
Hearing aids are available in a number of styles, models and colours, and can be worn behind the ear (BTE), on the ear (mini BTE), in the ear (ITE), in the canal (ITC) or completely in the canal (CIC) and even as a body aid strapped to a child's chest (Marschark 2009:42). The behind-the-ear aid is most commonly used in children not only because children's ear canals are continually growing, but also because the BTE hearing aids can easily connect to personal FM systems. The body aid is still in use on occasions with younger children and babies because they tend to lie down often, drool and have very small, soft ears. Body aids are also fitted to those children with physical impairments, because it is easier to access and manipulate the controls (Haynes et al 2006:300; Robertson 2009:53). All hearing aids have a microphone to convert acoustic signals into electrical signals; an amplifier to increase the volume of the signal; a battery as the source of power; a receiver to convert the amplified, modified speech signal back into a signal that can be heard; and a custom-fitted ear mould. Children need to have the ear moulds adjusted as their ears change shape and size because the ear mould must be airtight to avoid acoustic feedback or a high-pitched whistling sound which will interfere with sound reception. Teachers need to be familiar with the parts and the function of hearing aids in order to support children with daily basic care and maintenance (Brown 2006:32). A correctly fitting and functioning hearing aid is an

integral part of a child's ability to gain access to classroom instruction and communication (Haynes et al 2006:302).

Hearing aids can meet the requirements of all types and degrees of hearing loss, even for individuals with severe to profound hearing loss at the frequencies central to speech reception. Thus, if the hearing loss is more complicated because it comprises losses at certain frequencies or neural damage, hearing aids can act as a signalling device by alerting the user if someone is approaching, if someone is addressing them even though they cannot understand the spoken words, or when a sound-related event occurs. This signalling device is crucial for young children to gain insight into the nature of the surrounding auditory environment, the relationship between cause and effect and the nature of communication, as this will support their cognitive development and provide a link to their life-world (Marschark 2009:41). Audiologists strongly advocate that hearing aids be fitted directly after the diagnosis of hearing loss in children in order to facilitate the exposure to auditory information without delay since the early use of hearing aids expedites language development; although research has not shown this to be the case in learners diagnosed with congenital hearing loss (Marschark, Lang & Albertini 2002:50). Hearing aids not only play a pivotal role as a vehicle for children to access the spoken language of hearing parents and siblings, but if the hearing loss is progressive in nature hearing aids act as a 'temporary bridge' to both manual and oral forms of communication (Marschark 2009:43).

It is essential for educators to recognise that the use of hearing aids does not come without problems. Analogue hearing aids amplify all sounds equally resulting in *all* environmental noise being made louder. Therefore, hearing aids work more successfully in a quiet classroom environment where the speaker is in close proximity to the listener (Brown 2006:31). Another point to consider is that access to speech sounds does not automatically mean that the listener comprehends what has been said – understanding of language occurs in the brain, not the ear (Marschark 2009:42). Although more costly, digital hearing aids are preferable because they are programmed to amplify only the signal for those frequencies that correlate to an individual's hearing loss, resulting in less interference from background noise (Marschark 2009:42). In addition, digital hearing aids reduce loudness discomfort, acoustic feedback, and increase the audibility of soft sounds (Harkins & Bakke 2003:413). Although the research participant had digital hearing aids fitted initially, she did not show any progress in respect of speech reception or production.

Figure 2.3 Styles of hearing aids



(*Source*: Healthlob.com. 2011. Types of Hearing Aid)

Children who are deaf or hard-of-hearing (DHH) have to deal with constantly changing and challenging listening environments in and around the classroom and school. If they are to receive the full benefit of the word-sound differences that underpin the development of spoken language and communication they need to be able to retrieve an intelligible speech signal. The teacher must ensure that his or her voice is not competing with other background noise which may come from talking, air conditioners, traffic, furniture moving etcetera. Children must sit close to the teacher or they could lose up to 55 per cent of speech information resulting in gaps in knowledge and concept formation. Reverberation or echo produced from high ceilings, uncarpeted floors and hard walls masks the direct sound energy and causes the teacher to speak louder, resulting in a distortion of the vowel sounds in particular (Brown 2006:30). This protocol should be followed even if the learner has cochlear implants because the learner must see the teacher's face in order to speech-read.

In contrast to the hearing aid which essentially just amplifies sound and transports it to the impaired hearing mechanism, a cochlear implant is a device which bypasses the hearing mechanism of the ear to directly stimulate the auditory neurons situated in the inner ear, thus

introducing another element of choice for people who are DHH, particularly those who do not benefit from amplification (Harkins & Bakke 2003:414, 417).

The research participant, Sally (pseudonym) was fitted with digital, behind-the-ear hearing aids after hearing tests revealed a hearing 'impairment'. However, her hearing loss progressed rapidly to the point when although even more powerful hearing aids were fitted, there was no response to amplification. This resulted in the participant losing the speech she had acquired prior to contacting meningitis. The research participant's mother raised funds for cochlear implant surgery, as the research participant was deemed a suitable candidate for the procedure. Sally was fitted with her first cochlear implant in the right ear at the age of 4 years and 3 months. The left ear was implanted at the age of 7 years and 3 months, although a shorter electrode was used due to calcification of the cochlea.

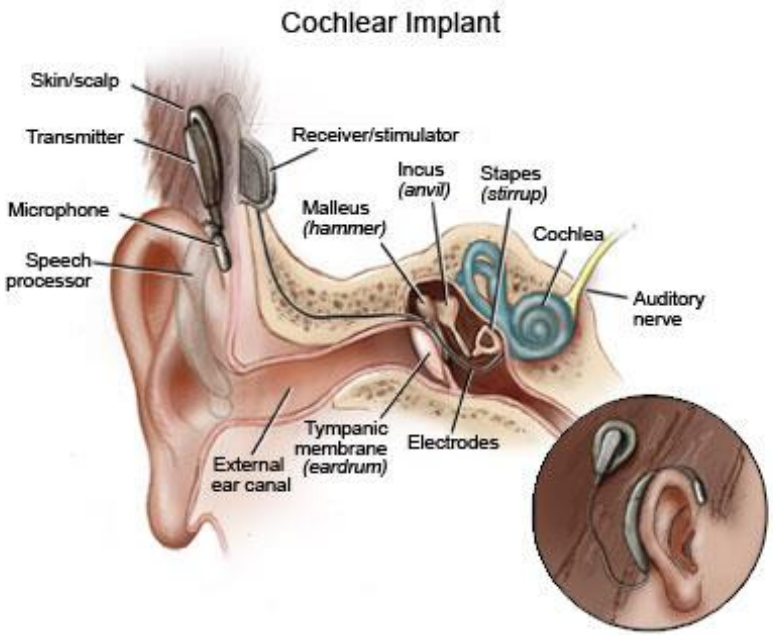
2.2.6.2 *Cochlear implants*

A cochlear implant device is an innovative, high-powered, computerised amplification medical prosthetic device that has revolutionised hearing rehabilitation for people who have severe to profound sensorineural hearing loss and who derive little or no benefit from using hearing aids (Harkins & Bakke 2003:414,417). An in-depth discussion of cochlear implants is pertinent to this study as the research participant has been fitted with bilateral, behind the ear (BTE), cochlear implant devices.

A multi-channel cochlear implant – also referred to as a 'Bionic ear' - has both external and internal components. The external part, which is worn outside the ear or may be attached to clothing, looks like a conventional hearing aid. It consists of a microphone receiver which picks up environmental sound and transmits it to a speech processor which, in turn, changes the sounds that vary in pitch and intensity into electrical signals of discrete frequencies. These coded signals are then sent along a wire to a magnet housing a small radio frequency transmitter that transmits a tiny radio signal. The transmitter transfers the code across the skin to the internal part of the implant unit to be received by a small radio frequency receiver stimulator unit. This unit is implanted under the scalp, above and behind the ear, in a small depression in the skull during surgery. This receiver unit encodes the radio signal into small electrical signals again which are then delivered along a smooth wire through an electrode array that is strategically coiled in the spiralled cochlea of the inner ear. These electrodes send electrical impulses to the auditory nerve fibres at specific intervals along the cochlea spiral which correlate to various sound frequency bands filtered by the speech processor. In this way any damaged hair cells and nerve endings are avoided. The electrical impulses are perceived as sound by the brain within microseconds of

the external microphone picking up sound. However, if the cochlea is ossified, hardened or calcified after meningitis, or because of prolonged disuse, the electrode wire cannot be completely inserted into the cochlea with the result that only lower frequencies will be transmitted (Haynes et al 2006:307; Marschark 2009:44-46). Medical evidence has indicated that the research participant has calcification of the cochlea as a result of meningitis – the left ear is more affected than the right ear with the result that the electrode wire has not been fully inserted into the cochlea of the left ear. Audiological readings indicate a drop on the higher frequencies. The resultant effect on speech sound production is discussed later in this study. Figure 2.4 below illustrates a behind the ear (BTE) cochlear implant device much like the devices worn by Sally in and around both ears.

Figure 2.4 Behind the ear (BTE) cochlear implant



(*Source*: KidsHealth. n.d. Cochlear Implants).

It is pertinent to note that cochlear implantation is not a life-saving procedure; it is major elective surgery, the outcome of which rests on numerous factors. Cochlear implantation does not automatically make a deaf child a hearing child – the child is still hearing impaired - and the potential benefits of the implant may only become apparent over a period of months or even years (Haynes et al 2006:306; Spencer & Marschark 2003:435,440; Watson, Gregory & Powers 1999:44,49). There is a vast amount of variability in standardised tests which measure clinical outcome and benefit post cochlear implantation in profoundly deaf individuals. Why some profoundly deaf children benefit greatly from cochlear implantation and others do not is

dependent on a myriad of factors and is of major clinical importance in the field (Pisoni, Conway, Kronenberger, Horn, Karpicke & Henning 2008:52,94). Spencer and Marschark (2003:437-438) concur by stating that researchers have indicated variables such as anatomical, physiological, and technological differences; duration of profound deafness before implantation; duration of cochlear implant use; age of implantation; communication modalities; cognitive skills; family involvement and support; education; visual attention as well as psychological development as factors which need to be considered when judging the efficacy and effectiveness of cochlear implantation in each individual. The nature and frequency of post-implantation speech and audiology therapy received will also impact on the success of cochlear implantation (Marschark 2009:51). The research participant has her own unique set of circumstances and all of these variables have impacted on the success of her bilateral cochlear implants.

Approximately a month after implantation the speech processor must be programmed or 'mapped' to suit the unique audiological needs of the child. This takes place over a period of time as the child's perceptions with the cochlear implant transform (Chute & Nevins 2006:70). The audiologist connects the child's speech processor to the computer to determine the child's threshold levels coupled with comfort and discomfort levels, and the electrodes are calibrated accordingly. The audiologist will also set the volume, sensitivity levels, locks and controls so that the settings cannot be altered accidently (Mashie et al 2006:39). The research participant has to have her implants re-mapped at regular intervals, depending on the pure tone audiometry readings at any specific time.

Although the cochlear implant does provide sound sensation, the information supplied via the device is not as distinct as that provided by an efficient functioning cochlea, and is, therefore, not the same sound sensation heard by hearing individuals. The sound perceived via the cochlear implant has been described as "coarse", "degraded" or as having a harsh, grating, staccato vocal timbre. Thus, children must receive intensive support so that they can learn to utilise the device in order to recognise and assimilate the sound sensations perceived in the environment (Marschark 2009:49; Watson et al 1999:45). Postlingually deaf individuals must learn how to relate the new auditory input provided by the cochlear implant with their memories of speech and with their previously acquired knowledge of the syntax, morphology, semantics and phonology of spoken language. However, prelingually deaf individuals are confronted with the task of trying to develop auditory-based receptive language with very restricted prior input, knowledge or experience, coupled with considerable delays in spoken language acquisition, as well as a lack of implicit knowledge regarding the structure of spoken language information they will receive via the device (Marschark 2009:49; Spencer & Marschark 2003:435-436).

Marschark (2009:50) pays reference to his colleague Patricia Spencer who stated that

> Asking a child to make sense of, and be able to reproduce, spoken language received only through a cochlear implant is somewhat like asking the child to recognise and draw a picture of an exotic animal they have never seen before that is standing behind a tall picket fence. Only parts of the strange animal are visible through the spaces between the wooden slats of the fence. The child must complete the image in his or her mind, imagining the shape of the parts of the animal that are not directly visible

The majority of children with implants have speech and language skills which correlate to those of children with severe hearing loss. Spencer and Marschark (2003:436) cite various authors who have found that children with hearing losses above 100 dB, and who do not derive benefit from hearing aids, have developed speech perception skills post cochlear implantation comparable to those anticipated for children with losses in the 88-100 dB range who make use of hearing aids. The research participant has hearing losses in the range 100-120 dB which puts her into the range of a child with severe to profound hearing loss even when aided by implant units. However, Vermeulen et al, quoted in Spencer and Marschark (2003:436) indicate that children who are deafened by meningitis generally have a depth of auditory experience prior to becoming deaf, resulting in improved post cochlear implantation performance levels in the range 70-80 dB. However, this still falls within the range of severe hearing loss (71-90 dB). The research participant lost her hearing faculty at the age of 20 months which means that she did have prior auditory experience. According to Yule (1996:180) Sally would be in the linguistic, two-word stage at this age.

Thus, cochlear implantation does not automatically ameliorate the educational difficulties that deaf and hard-of-hearing (DHH) learners encounter, and it is vitally important that all stakeholders are aware of the educational implications concerning learners who have either unilateral or bilateral cochlear implants, particularly since increasing numbers of these learners are being accommodated in mainstream schools (Karchmer & Mitchell 2003:42; Spencer & Marschark 2003:440).

Firstly, it must be considered that learners who are DHH, including those who have been fitted with cochlear implants, may require adaptive and alternative teaching strategies and learning experiences in order for them to achieve the required outcomes. Thus, effective curriculum design must take into consideration the very nature of these learners with regard to their levels of reading and writing ability; their preferences with regard to communication approaches; their reliance on visual information; their need to concentrate simultaneously on various visual inputs such as lip-reading, signing and screens which hold visual information; and their limited lexical knowledge (Power & Leigh 2003:43).

Secondly, an adaptive curriculum necessitates adaptive methods of assessment for DHH learners in the mainstream who embrace the auditory-oral method of communication or spoken language approach – this includes cochlear implant users. These learners should be given instructions both orally and then in written form as a backup; the educator must ensure that he or she faces the learner directly when asking any questions to facilitate the learner's ability to lip-read; the environment should include assistive devices such as a sound field system, an FM system or an induction loop; learners should be allowed additional time, the use of a dictionary or thesaurus, or even a computer with a grammar check on it; and listening exercises and oral assessments should be replaced with more suitable alternative assessments in visual format (Storbeck 2007:360).

Thirdly, it is also pertinent to consider the actual classroom environment when accommodating learners fitted with cochlear implants. Generally speaking the average classroom is not well constructed acoustically and this presents a huge challenge for these children. Not only are they expected to listen to, comprehend and respond to information, but they must do so against a backdrop of background, reverberating noise such as heating or ventilation systems, activities within the classroom or the surrounding classrooms, and environmental noises such as traffic nearby. The speech output of the educator with regard to intensity and clarity is also vitally important (Chute & Nevens 2008:165-167). Learners who are subjected to elevated noise levels and too many people talking at once do not derive benefit from their cochlear implants – these learners may prefer to switch their devices off because of the unpleasant feeling of being overloaded by too much stimuli (Pisoni et al 2008:59).

In addition, the classroom teacher who facilitates learners fitted with cochlear implants must be aware of changes such as signs of discomfort associated with the implant; changes in general behaviour; avoidance of communication; changes in ability of speech production or perception as well as changes in response to environmental sounds (Watson et al 1999:46). If a child fitted with a cochlear implant appears lazy, disinterested or even show signs of problematic behaviour, it may simply be that the unit needs new batteries (Robertson 2009:247). Thus, a baseline of performance, or the child's usual responses should be noted and any deviations or fluctuations in auditory performance may indicate a lack of integrity of the cochlear device (Chute & Nevins 2008:80-81).

The research participant is in a small group of about 10 learners and she sits close to the teacher who makes sure that she faces the child when speaking, and the more dominant right ear is favoured during listening and speaking. The educator goes through notes with the research participant pro-actively so that when lessons are taught the research participant has prior

knowledge of concepts and lexicon. The classroom environment is controlled as much as possible and the research participant stops the lessons if she feels the need to change the batteries in the external processors.

2.2.6.3 Assistive listening devices

One way of overcoming these difficulties experienced with speech signal to noise ratio in the classroom and to increase the utility of cochlear implants is to incorporate additional assistive listening devices such as the Sound-Field System (SFS) or the personal FM System. The Sound-field system is useful in the classroom where a number of children may need to be given additional support because the teacher's voice is amplified when he or she speaks through the microphone. The acoustic receivers, which are placed in strategic positions around the classroom or even the hall, supply a uniform signal no matter where the deaf and hard-of-hearing (DHH) children are in the room, thus creating a more effective signal-to-noise ratio for those children. If only one child requires additional listening and speaking support, the personal FM system may afford the child a better signal-to-noise ratio because the input is sent directly to the learner's implant device. However, it must be noted that children fitted with cochlear implants must first become experienced in the use of these assistive devices before any supplementary assistive devices such as sound-field systems and personal FM systems are introduced. Additionally, educators must be trained in the proper use and management of these systems because sound-field systems are not without their limitations – systems that are not correctly calibrated may reduce signal input to the cochlear implant user or may create discomfort if set too high (Chute & Nevins 2008:168-177).

Assistive devices and amplification technology may be used to facilitate access to sound, but the ultimate goal is to facilitate access to communication. Communication access is characterised by the ability to receive information through the visual and auditory modalities for the purposes of learning and for interacting face-to-face on a daily basis with other people. However, for people who are DHH, it is the visual modality that they must primarily depend on to support access to communication (Mahshie et al 2006:17-18). There are various communication options and approaches that may be adopted in order to expedite access to language and communication in people who are DHH.

2.3 COMMUNICATION APPROACHES USED BY THE DEAF AND HARD-OF-HEARING

Communication by means of verbal and non-verbal language, whether the communication is deliberate or incidental, is pivotal to the human experience (Siegel 2008:17). Human communication is a multifaceted developmental process during which children reach various stages of development with regard to communication skills as they mature towards adulthood. Communication is a process of exchange – a way of expressing and exchanging ideas, opinions and emotions; with speech, language, gestures, signs, facial expressions, body language and art form being the vehicles of communication (Haynes et al 2006:41). Affording all children the best possible access to communication and language is fundamental to their sound linguistic, communicative, educational and psychosocial advancement and this is particularly important for children who are deaf or hard-of-hearing (DHH) (Mahshie et al 2006:56).

Although not without controversy, various communication methods or approaches may be employed to overcome the barriers to language, literacy and learning faced by DHH individuals and thus ensure the development of unrestricted access to fluency of communication. On the one hand are proponents of the 'oralist' philosophy who advocate the use of speech, speech reading, and residual hearing supported by the use of amplification technology, without the use of signs or gestures, in order to facilitate oral receptive and expressive communication skills (Lynas 1994:2; Marschark et al 2002:25; Paul 2009:127). This philosophy is based on the principle of 'normalisation' and it is underpinned by the medical model or the clinical-pathological paradigm which views deafness as a defect which needs to be remediated. This approach is aimed at fully integrating the deaf individual into the major, hearing society since as much as 90 per cent of children who are DHH are born into families who have normal hearing abilities. Advantages of this approach include the ability of the DHH individual being able to integrate into the hearing community without the community having to make any adjustments to facilitate this person. Additionally parents and educators can use spoken language instead of having to learn how to sign. The earliest possible intervention and education coupled with vigorous support from parents, educators and therapists alike is advocated. However, this approach is not in keeping with the concept of educational inclusion because learners must be rehabilitated by means of surgery (cochlear implantation), the fitting of hearing aids and by attending speech therapy in order to fit into the system rather than being supported by a needs-based, adaptive curriculum approach (Morgan 2008:6; Storbeck 2007:353-354). The research participant fits within this framework since she was born to hearing parents, she uses the spoken language approach without any form of sign or gesture, and she has undergone cochlear implantation surgery.

Oralists are of the opinion that DHH children who are not exposed to spoken language as early as possible will be impeded in both auditory and oral development. They believe that the use of sign language alone separates DHH individuals from the major hearing world and community in which they live, socialise and eventually work (Storbeck 2007:355).

On the other end of the continuum are the 'manualists' who maintain that sign language should be the only form of communication so that DHH individuals may integrate into the minor Deaf community and uphold Deaf culture (Lynas 1994:2; Marschark et al 2002:25; Paul 2009:127). Proponents of the sign language approach, which is central to the visual-gestural modality, thus believe that sign language should be the first, natural method of communication or the first language used by DHH individuals. DHH children should be exposed to and start using natural sign language as soon as possible to ensure that natural sign language development follows the same pattern of development as with spoken languages. Ideally DHH children should thus be educated by teachers who are also deaf and who are fluent in sign language; and parents should sign to their children from the start (Storbeck 2007:354). The manual approach is based on the social model on disability which does not view disability as something in need of remediation, but rather attempts to remove any possible societal or environmental barriers to learning so that the child can be developed holistically according to his or her unique needs (Storbeck 2007:354; Uys 2007:406).

Manualists are critical of the oral approach to communication for DHH individuals because they believe that this approach restricts the social environment of DDH individuals because these individuals cannot socialise effectively in the Deaf community. Not only do they not 'fit' fully in the Deaf community, but they may also feel that by being DHH they are unable to 'fit' fully in the major hearing community – this could have a negative impact on their general academic progress and psychological health (Storbeck 2007:354-355).

2.3.1 Oral approaches

There are two major oral methods, namely the Auditory-Verbal (AV) Method and the Auditory-Oral (AO) Method. The key elements of these oral approaches revolve around the use of spoken language, speech reading, residual hearing, amplification technology, visual, tactile and auditory assistive devices and auditory training or auditory learning, without the use of signs, gestures or other manual systems such as finger spelling to augment communication (Marschark 2009:87; Mahshie 2006:72; Paul 2009:137 Storbeck 2007:353). However, visual cueing systems such as Cued Speech may be used in conjunction with audition (Storbeck 2007:353).

2.3.1.1 *The Auditory-Verbal approach*

Estabrooks (quoted in Beattie 2006:110) defines auditory-verbal therapy as the application and management of technology, strategies, techniques, and procedures to enable children with hearing impairments to learn to listen and understand spoken language in order to communicate through speech. In other words the Auditory-Verbal Method lays emphasis on utilising residual hearing to augment the listening skills and thus reduce the use of speech reading in learners who are DHH. During speech therapy sessions the therapist's mouth will be covered so that the learner is forced to use the auditory modality without relying on the visual cues to comprehension given via speech reading (Marschark 2009:87). This is essentially a unisensory, aural-oral approach or acoustic method (acoupedics) whereby the primary sense of audition is developed so that the learner may enhance their spoken language skills in order to integrate in various social and family settings - this validates communication as a social act (Marschark 2009:87; Paul 2009:129,137). Mainstream education is emphasised, but this integrative placement must be supplemented with intensive individualised speech therapy support sessions (Marschark 2009:87). Early identification and early use of amplification technology coupled with sound auditory management are crucial components to the success of this approach. Vision or taction (touch) may be introduced at a later stage for learners who require a tactile-kinaesthetic approach to support their learning if they do not derive sufficient benefit from the traditional oral approaches (Paul 2009:128-129;137). Moores (2001:277) is critical of the acoupedic method because he is of the opinion that it undervalues the visual modality which is a highly valuable channel of communication for any DHH individual.

2.3.1.2 *The Auditory-Oral approach*

The Auditory-Oral approach to the development of spoken language and communication is underscored by the utility of both the auditory and visual modalities. This is thus a multisensory approach whereby equal emphasis is placed on both speech reading (vision) and residual hearing (audition) to facilitate receptive and expressive language development. A tactile component may also be incorporated when necessary and this would be referred to as an auditory-visual-tactile approach. This approach also stresses the importance of early identification; early amplification using the best available hearing technology; the pivotal role played by parents; the delivery of effective learning programmes by proficient educators, and continuous auditory management coupled with continuous auditory therapy, the latter incorporating more drill and practice. In contrast to the Auditory-Verbal approach which stresses mainstream education, the Auditory-Oral method emphasises the need to offer support to learners in a variety of educational settings such as in separate classrooms for DHH learners; to

reverse mainstream settings whereby mainstream learners attend the separate classrooms for DHH learners either part-time or for the full school day; or where DHH learners are mainstreamed into the regular classrooms on a part-time or full-time basis (Beattie 2006:110-113; Marschark 2009:87-88; Paul 2009:129;137). There has been a slight shift in emphasis in the contemporary approach to the Auditory-Oral method in that, whereas the use of speech reading was actively encouraged in the past to support the development of spoken skills via the visual channel, speech reading or natural gestures are neither focused upon or discouraged (Beattie 2006:112-113). The research participant uses the Auditory-Oral or spoken language approach with the aid of speech reading augmented by residual hearing enhanced by bilateral cochlear implants.

Speech reading or lip reading is the art of understanding the spoken word through observation of the speaker's face (Berger, 1972; Dodd & Campbell, 1987; Jeffers & Barley, 1971; O'Neill & Oyer, 1981; Silverman & Kricos, 1990, quoted in Paul 2009:138). Speech reading or lip-reading is not an easy task – it is a highly complex process which requires a great deal of visual concentration and effort, and it is very tiring to focus on the speaker's mouth over an extended period of time (Watson et al 1999:22). Deaf and hard-of-hearing individuals actually have a very limited access to oral language through speech reading because only approximately 20-30% of spoken English is visible on the lips, even in dyadic conversations. The reason for this is that many speech sounds look alike as they are pronounced, particularly in English - this makes effective lip reading or speech reading very difficult (Leybaert & Alegria 2003:263; Marschark, Lang & Albertini 2002:79; Marschark & Hauser 2012:48; Spencer & Marschark 2010:62). For example, it is difficult to disambiguate words such as 'fat' and 'vat' because the lip movements look the same when these words are voiced. It must be noted that the discrimination of words by speech reading is also dependent on the effects of the surrounding sounds in a word – this is called 'coarticulation' (Paul 2009:35). It has been indicated that people with normal hearing acuity actually retrieve phonological representations both acoustically, and visually via speech reading - so it is no wonder that DHH children are restricted in their ability to develop comprehensive phonological representations (Leybaert & Alegria 2003:261).

Paul (2009:131) states that acquiring any language is dependent on the ability to access the phonology of a language because the phonological components are deemed to form the building blocks of language acquisition. This includes both the segmentals, which are the sounds made by the vowels and consonants (phonemes), as well as the suprasegmentals which include rhythm, pause and intonation (prosodic elements of language). Phonological knowledge is foundational to the development of phonemic awareness and phonics, both of which underpin the development of literacy skills. Leybaert & Alegria(2003:261) concur by declaring that if children cannot retrieve sufficient phonological information, they will not be able to map sound-to-speech successfully

and this will, in turn, be detrimental to their acquisition of spoken language and, indeed, any related cognitive activities (Leybaert & Alegria 2003:261).

Against this milieu the late Orin Cornett was prompted to develop a system called 'Cued Speech' in an attempt to render the phonology of a language more accessible. The reason for incorporating Cued Speech with the spoken language approach is to expedite the development of language in DHH children (Paul 2009:131).

The keystone of this research undertaking involves Word Level teaching of the 44 phonemes as the building blocks of the English language in order to enhance the literacy development of a deaf Intermediate Phase learner who uses the spoken language approach. The Phoneme Machine, which is a feature of the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme, uses human moving lips to support lip reading and help disambiguate phonics. The Cued Speech option displays the shapes, positions and movements of the hands in synchronicity with the lips to support the development of phonemic awareness and phonics – skills which are foundational to the development of literacy proficiency. One of the sub-questions of this study is to evaluate the role of Cued Speech in supporting this deaf leaner's ability to disambiguate phonics and increase her knowledge of phonology. The research participant will be introduced to Cued Speech for the first time during this research undertaking.

2.3.1.3 *Cued Speech*

Cued Speech was not created as a substitute for sign language; neither does it fall into the category of an artificial manually coded system. The central tenet behind the development of Cued Speech was to design a phonemic-based support system which would enable deaf and hard-of-hearing (DHH) children improved visual access to the auditory-based phonological structure of spoken language and thus facilitate the development of literacy skills. Marschark and Hauser (2012:49) emphasise that the purpose of Cued Speech is not to teach speech, but to support literacy development. Cued Speech is a mode of communication whereby the visual mouth and lip patterns produced in speech, together with manual signals or cues via hand shapes and hand locations around the mouth, are produced in synchronicity in order to disambiguate phonemes and syllabic structures (Hage & Leybaert 2006:193; Leybaert & Alegria 2003:262; Marschark 2009:88). However, Cued Speech as such is not technically a language and it does not endorse the philosophies of either Oralism or Manualism as deaf communication methods, even though a 'manual' method is used in conjunction with an 'oral' approach to linguistics (Marschark 2009:88-89). Cued Speech has been modified to offer support across approximately 56 traditional languages and major dialects and is, therefore, not used exclusively

in English-speaking nations (Spencer & Marschark 2010:62).

Cued Speech makes use of eight hand shapes which correspond to specific groups of consonants, together with four hand locations on or near the face (side of mouth, chin, throat, side of face) to represent single vowels (monophthongs) and diphthongs. The American version only differs in one instance to the British system with regard to the hand shapes which clarify consonant sounds in that the American system adds the consonant digraph 'wh' to the hand shape which codes the phonemes 'n' and 'b'. However, there are a few differences between the two cueing systems with regard to the depiction of the monophthongs and diphthongs hand positions around the mouth. Cued Speech South Africa (CSSA) has adopted the British version because South African English is based on British English (refer to Appendix L for the UK Cued Speech Chart with International Phonetic Alphabet [IPA]).

The single consonants and consonant digraphs (tH, th, sh, ch, ng, zh) which can be distinguished during speech-reading are grouped together on one of eight specific hand shapes, and the short and long vowel monophthongs (vowel digraphs) which are more easily discernible are grouped together at the same location on and around the face. For example, the /l/, /w/, and /sh/ consonant phonemes are depicted by the same hand shape (index finger and thumb extended) and the /i/, /oo/, and /a/ short and long vowel monophthongs (digraphs) are at the same location around the face (centre of throat position). The diphthongs are cued by two different hand locations gliding into each other to show that there are two vowels which run into each other. For example, the 'oy' as in 'boy' would first be cued with the hand shape which represents the preceding consonant, the 'b' sound (all four fingers extended with the thumb closed on the palm of the hand), at the chin position where the 'o' vowel phoneme is located; the hand shape changes to neutral position where all four fingers and thumb are extended as the hand glides quickly and smoothly down to the throat where the 'i' sound is located (hand). Phonemes that are difficult to distinguish on the lips are coded by different hand shapes and in different locations. For example, the 'p' in 'pat' (only index finger extended) and the 'b' in 'bat' (four fingers extended with thumb bent into palm of hand) would be represented by different hand shapes and the 'a' in 'cap' would be in a different mouth location (throat) from the 'o' in 'cop' (chin) because it is difficult to distinguish the articulation of these consonant and vowel sounds by lip reading alone. In addition, for a vowel not preceded by a consonant, the neutral hand shape which is also used to represent the /t/, /m/, and /f/ will be used at the mouth location which corresponds to that particular vowel. Thus, the words 'it' and 'if' would be cued in exactly the same way, but because of the assimilation of lip-reading and manual gestures, the DHH child would able to distinguish between the two words (Hage & Leybaert 2006:193-195). Non manual signals (NMS), which are exaggerated mouth movements, may also be incorporated to distinguish certain consonants and

vowels which appear very similar on the lips (Fleetwood & Metzger, quoted in Paul 2009:132-136).

The question now arises as to whether Cued Speech actually fulfils its purpose of enhancing the development of literacy skills in DHH learners by providing a manual system to represent auditory-based phonemes in the form of hand shapes and hand locations on and around the face, and thus facilitate visual access to and disambiguate the phonology of spoken language? Spencer and Marschark (2010:62) have noted that despite the recent advances made in the field of amplification technology and earlier intervention, coupled with the early implantation of cochlear devices, there has been a dearth of recent peer-related research articles on the use of Cued Speech with spoken English. Alegria and Lechat (2005:132) concluded in their study to assess the way in which speech-reading and Cued Speech work in unison or congruence, that future research should attempt to understand the nature of this integration.

> The notion that speech is multimodal and that it includes a natural visual dimension, lip-reading that allows an artificial visual signal, CS, to elaborate a phonological signal has important consequences. This means that CS is not just an artefact aimed at helping deaf children distinguish between words, but that it becomes a genuine part of speech processing and speech representation.

Paul (2009:156) comments that recent research reviews seem to support the idea that Cued Speech scaffolds the development of English and English literacy as well as the use of a phonological code. However, early exposure to Cued Speech is crucial because phonology, phonemic awareness and morphological structures develop in the early years. Hage and Leybaert (2006:196-197) concur by citing the results of research undertaken by Alegria et al (1999) which support the notion that early exposure to Cued Speech augments the efficacy of processing phonological information. These authors further advise that studies have indicated the difficulty of deaf children in acquiring grammatical morphology because morphemes are not easily accessed through speech reading.

This research undertaking will attempt to evaluate the part played by the Cued Speech option of the Phoneme Machine in supporting the research participant's ability to disambiguate phonics and thus enhance her literacy skills. This is one of the specific research objectives of this study.

The above discussion bore reference to the communication approaches used by the deaf and which are framed within the philosophy of Oralism, except for Cued Speech which is a manual system used in synchronicity with speech reading and the auditory-based spoken language approach. In contrast to this is the philosophy of Manualism which emphasises the sign language approach, which uses the visual-gestural modality as method of communication.

2.3.2 The manual approach

A signed language is just like any other spoken language because it is comprised of a substantial lexicon of arbitrary signs in combination with grammatical rules that structure the formation of individual signs as well as sequences of individual signs that make up phrases and sentences. A manual alphabet (fingerspelling) as well as number concept signs are also represented in naturally-occurring sign languages. Just as there are variations in spoken language between different cultural groups there are variations in sign languages. American Sign Language (ASL), British Sign Language (BSL) and South African Sign Language (SASL) are quite different from each other with regard to hand shapes, vocabulary and linguistic structure with the result that a signer who uses SASL would not understand signers of the other sign languages (Marschark 2009:66-67;69). Additional to this is dialectical variation across age groups, geographical regions and ethnic groups, which affect sign production and vocabulary usage. For example, a deaf or hard-of-hearing (DHH) individual from the Cape would have a different sign language dialect from a DHH individual from Johannesburg (Morgan 2008:9).

The term 'manual communication' with regard to sign language is misleading to some extent because, although signing predominantly involves movement of the hands, it is not only the hands which are involved in signing. True natural sign languages incorporate facial expressions, gestures, body language, as well as variations in signing rate, signing size and sign selection in order to convey emotions and transfer grammatical information. Additionally, mouth movements and sign modifications may be utilised to augment the availability of 'comprehension cues' to the person receiving the communication, particularly in educational settings (Marschark 2009:66). Fingerspelling may also be used as an extension of signing system.

2.3.2.1 *Fingerspelling*

Fingerspelling is a manual coding system used to represent both the alphabet, letter by letter, and the number system of the English language one symbol at a time in a manner similar to that of Morse code in order to supplement signing (Marschark 2009:73; Paul 2009:177). Fingerspelling may be incorporated into any sign system to communicate words which are not represented by conventional signs; where signs are unfamiliar or indistinct; to convey words even if there are common signs in place for certain concepts; to place greater emphasis on a particular word by 'spelling it out', or to depict different parts of speech (Marschark 2009:73; Marschark et al 2002:78). This supplement to natural signing is considered a useful extension for DHH learners who already use a sign language because it supports the development and progression through the stages of spelling and the alphabet system. It may also expand their knowledge of English

orthography and morphology (Paul 2009:181). However, if only fingerspelling is used to communicate, it would represent a spoken language such as English and would not be deemed part of a natural sign language such as ASL, BSL or SASL (Moores 2001:213).

2.3.2.2 *Pidgin signed English*

Pidgin Signed English is a hybrid system which utilises a simplified form of a naturally occurring sign language such as ASL, BSL or SASL, together with fingerspelling for augmentation, but with a reduced vocabulary, minimal inflection and an uncomplicated subject-verb-object word order. It incorporates the grammar of the local spoken language and is generally used when DHH individuals come into contact with hearing individuals. It is thus also referred to as 'contact sign' (Marschark et al 2002:78).

2.3.2.3 *Manually coded English*

Alternative hybrid sign systems, which are combinations of signing and English, have been developed by educators in an attempt to scaffold the literacy development in DHH children. These hybrid systems are known as manually coded English or English-based sign systems and they represent English in a manual manner on the hands as opposed to on the lips (Marschark 2009:80). Manually coded English systems including Signed English, Sign-supported English, Signing Exact English and Seeing Essential English were developed in an attempt to manually represent the grammatical structure of English in a visual form, especially the morphology of English, so that the rules of English may be learned in a similar fashion to the manner in which hearing children learn to speak English. This would, in turn, hopefully foster the development of literacy skills such as reading and writing. However, although this is the intention, there is little evidence to support the effectiveness of these artificial sign systems in making DHH children fluent in sign language or in English (Marschark 2009:70;80-83; Paul 2009:170).

It must be re-iterated that any form of signed English is not a naturally-occurring sign language – it is an artificial, invented signing system which borrows many features, such as lexical signs of a natural-occurring signing system, but spoken English word order is used. Deaf children of hearing parents are seldom exposed to natural sign languages such as ASL, BSL, or SASL as first language, but they may acquire these manually coded English (MCE) systems as their first language (Schick 2003:219,225).

A variety of explicit language cues are employed using these hybrid, manually coded English sign systems to aid DHH children with their comprehension of language in educational settings. Since

these sign systems involve the user signing and speaking simultaneously, it is often referred to as simultaneous communication (SimCom) or it is sometimes referred to as total communication (TC) (Marshark 2009:66). However, in simultaneous communication manual signs, spoken words and morphemes are produced in congruency and thus follow the same grammatical structures of the spoken language. It is, therefore, a method of communication which falls within the framework of the total communication philosophy (Spencer & Tomblin 2006:168).

2.3.3 Total communication

Total communication is seen as more of an educational philosophy of or an approach to communication as opposed to a method of communication. This philosophy was born during the 1970s out of concern for the continual delays in academic, linguistic and speech development displayed by DHH children immersed in oral programmes (Spencer & Marschark 2010:66,68). Central to this philosophy is the utilisation of multiple modalities (aural, oral and manual) to incorporate all possible forms of communication such as listening, speaking, speech reading, reading and writing of text, both natural and artificial signing systems, as well as the use of assistive devices and amplification technology when communicating with and educating children with varying degrees of deafness. The ultimate goal is develop each child's ability to communicate on all levels to the full extent and thus achieve the best possible educational outcomes for each individual according to his or her unique needs (Spencer & Tomblin 2006:168-170).

Whilst this approach may seem the answer, large-scale research has indicated that DHH children have not been achieving any better after being immersed in total communication programmes. It has also been argued that it is difficult for the brain to process aural, oral and visual stimuli simultaneously; that there are inconsistencies of approach and implementation in different schools; and that since artificial signing systems are used, DHH individuals may not be able to participate fully in the Deaf community (Spencer & Tomblin 2006:172,174). Marschark (2009:83) concurs by stating that although it seems evident that the bringing together of a multiplicity of sources of information may effect an advancement in the literacy skills of DHH children in educational settings – and this is the premise upon which the total communication philosophy is based – the existing literature indicates that ''artificial sign systems, however, do not lead most deaf children to fluency in either sign language or English''.

The failure of purely oral and total communication programmes to raise the academic, communication and literacy levels, or address the needs of DHH learners in educational settings, set the stage for the development of a new, bilingual approach to the education of DHH children during the 1980s. This led to the adoption of the Bilingual-Bicultural Model to educating the DHH (Spencer & Marschark 2010:75).

2.3.4 Bilingual-Bicultural Model

The Bilingual-Bicultural approach takes cognisance of the fact that approximately 90 per cent of deaf or hard-of-hearing (DHH) children are born into hearing families and thus grow up predominantly in the majority hearing community without being exposed to sign language; neither are these children able to access the language spoken in the home or in the wider hearing community. In order to address this problem proponents of the Bilingual-Bicultural philosophy to deaf education believe that DHH children must primarily be educated in their first language, which is natural sign language, and subsequently in the language of their hearing family through the medium of reading and writing. Acquiring a sound knowledge of a natural sign language as first language should facilitate the acquisition of the spoken language of the hearing majority as second language and this, in turn, should impact positively on the academic achievement of DHH learners. Therefore, DHH children should not be educated in exclusively oral programmes or by means of contrived artificial systems such as those used in total communication (Lynas 1994:59; Marschark et al 2002:144-145; Storbeck 2007:356). Cummins, as quoted in Spencer and Marschark (2010:102-103), who is in agreement with this viewpoint, has put forward a linguistic interdependence theory which suggests that competency in one language will scaffold the ability to gain fluency in another language.

A child who is DHH is deemed to be *bilingual* if he or she is proficient in both a natural sign language such as ASL and in English; and *bicultural* if he or she understands the cultures of and is able to socialise within the Deaf community as well as the hearing community (Gallimore & Woodruff, quoted in Mahshie et al 2006:77). Storbeck (2007:356) has emphasised that natural sign language is derived from the visual-gestural modality whereas the spoken and written form of the language is framed within the aural-oral modality. Consequently, this approach to bilingualism for DHH learners differs from bilingual education for hearing learners because of the problem of bimodality. Therefore, educating DHH learners within a bilingual framework involves ‘’two languages [that] are equal but not the same, and so should be kept separate in use and in the curriculum’’ (Storbeck 2007:356). Successful implementation of the Bilingual-Bicultural approach in deaf education centres around the ability of educators to sign fluently; institutional support with regard to policies and resources; parental involvement; mutual support of

colleagues, and involvement of key Deaf individuals as tutors and role models (Storbeck 2007:356).

The Bilingual-bicultural model is framed within the inclusive, socio-cultural paradigm because deaf individuals are not perceived as deviant from the norm or inferior to the major hearing community. Rather they have a distinctive identity as a linguistic minority (Lynas 1994:60). However, the jury is still out on what constitutes best practice in order to accommodate DHH children within an educational setting.

Lynas (1994:100-101) is of the viewpoint that by engaging the auditory-oral or spoken language approach with young DHH children these children can be assured of the ability to attain a sufficient command of spoken language. This will not only act as a precursor to the acquisition of the ancillary print language, but it will also allow them to engage confidently in the majority hearing world.

> I believe, therefore, that it is the moral duty of educators to facilitate spoken language. It is only by offering the young deaf child the prospect of talking that the developing deaf individual can be offered the real option of deciding whether or not to take on a predominantly 'Deaf' social identity, or a predominantly 'hearing' identity or to participate equally in both 'Deaf' and 'hearing' worlds (Lynas 1994:100-101).

In contrast, Marschark (2009:64) has concluded that after considering the various communications approaches available to DHH children in educational settings, it must be emphasised that language, per se, is fundamental to the characteristic development of all humans including those who are DHH. It is critical to afford each and every DHH child the most effective method of communication by adapting our approaches to education and childrearing in order to accommodate his or her needs, and not by attempting to make a deaf or hard-of-hearing individual develop in the same way as his or her hearing counterpart. Existing evidence indicates that there is no one-size-fits-all approach that is applicable to all or even the majority of DHH children; that most DHH children would benefit from exposure to both signed and spoken language; and that access to sign language will improve the lives of most DHH children, even if they develop a reliance on spoken language as a means of communication at a later stage.

Marschark (2009:90) further emphasises that language plays a pivotal role in normal development. Since by far the majority of deaf children are born to hearing parents, these children ''will be denied access to many parts of the world until they have passed the most critical ages for language acquisition, the first 2 to 4 years''. People tend to consider spoken language as a vital component of a child's development, yet much of the research available suggests that

children with significant hearing loss, who are only exposed to spoken language, are more likely to be deprived of the essential linguistic tools they require to support their academic and social development. The research participant, who was born to hearing parents, suffered a severe to profound hearing loss at the age of 20 months. Although digital hearing aids were fitted, she did not respond well to them. She was only exposed to spoken language during the critical ages for language acquisition and her first cochlear unit was only implanted at the age of 4 years and 3 months, rendering her essentially language deprived.

Historically, the various communication options or approaches available in educational settings for DHH children have been politically motivated, based on perceptions, convictions and laden with controversy. In order to put contemporary trends in the educating of DHH children in perspective, it is pertinent to reflect back briefly on the most salient points in the history of Deaf education globally and within the South African context.

2.4 DEAF EDUCATION

> Deafness as a human condition occurs in all races. It is not gender-specific, race-specific, culture-specific or hierarchical and it has almost certainly been in existence throughout the history of humankind (Moores 2001:29).

2.4.1 Historical perspective of Deaf Education globally

There is no written evidence regarding any systematic attempts to educate deaf or hard-of-hearing (DHH) individuals prior to the sixteenth century, and the only historical information in existence during this period is generally within the European context. During the sixteenth century an Italian mathematician and physician by the name of Girolamo Cardona theorised that learning was not wholly dependent on the ability to hear and speak. He postulated that, together with the use of signs to explain abstract words, the written word could be used to educate the deaf to read and write. However, the first attempts to develop methods with which to educate the deaf, were pioneered in Spain (Moores 2001:37-38).

2.4.1.1 *Spain*

The sixteenth century heralded the first major contributions to the education of the deaf. Pedro Ponce de León, a Spanish Benedictine monk who has been recognised as the first teacher of the deaf, developed a manual alphabet while teaching deaf children of the Spanish aristocracy the skills of speaking, reading and writing so that the first-born sons, in particular, could gain inheritance and appear ‘normal’ in social circles (milan1880 2010; Moores 2001:38,55; timetoast

2011:1). However, there are no written records of teaching techniques employed by Ponce de León (Moores 2010:22).

The late sixteenth century and early seventeenth century heralded the next step in attempts to educate the deaf in Spain. Manuel Ramirez de Carrion, who is believed to be the inventor of speech training for deaf people, evidently taught speech by mapping individual letters to specific speech sounds (milan1880 2010).

However, it was Juan Bonet who was the first person to publish a book in 1620 describing a method for educating the deaf. Bonet advocated the use of a one-handed manual alphabet system to teach the deaf to read and write. He emphasised the importance of early intervention, early speech training and a stable language environment where all family members also used the manual alphabet. The groundwork laid by the Spanish in their attempts to educate the deaf stirred up interest in the education of the deaf in Great Britain (Moores 2001:42-43).

2.4.1.2 *Great Britain*

In 1659 William Holder taught a deaf individual speech skills through the use of the written word initially and then by means of a two-handed manual alphabet system. Holder took cognisance of the difficulties associated with speech reading by using context to differentiate between sounds that are difficult to disambiguate on the lips, and by using the same word in varying contexts to illustrate different meanings (Moores 2001:43-44).

At about the same time, John Wallis taught a student firstly by using the natural gestures used by this student and then by using writing and the manual alphabet. He subsequently focused on articulation training without the use of the manual alphabet and without paying much attention to speech reading skills (Moores 2001:43-44).
George Dalgaro produced a dissertation in 1680 on deafness and deaf education. He also recommended the use of the two-handed alphabet. He encouraged the use of fingerspelling from infancy and he stressed that deaf individuals had the same ability to learn as their hearing counterparts (Moores 2001:44).

The eighteenth century saw the establishment of the first school for the deaf in Britain which was opened by Henry Baker, but he never disclosed any teaching methods. Subsequently Thomas Braidwood opened Braidwood's Academy for the Deaf and Dumb in Edinburgh in 1767. Braidwood, acknowledged as the most prominent British educator of deaf children at the time, used an integrated approach by combining the two-handed alphabet, natural signs and gestures,

reading, writing, and the articulation of basic speech elements as a precursor to the articulation of syllables and words (Moores 2001:44-45). This was coined the 'Braidwoodian method of deaf education' (timetoast 2011:1). This combined approach was the forerunner of the total communication approach in which sign language and speech are used simultaneously (milan1880 2010). The pioneering influence of the Spanish also influenced the development of education for the deaf in France from the eighteenth century (Moores 2001:45).

2.4.1.3 *France*

Jacob Rodriguez Pereire, a teacher in France, favoured the oralist approach and developed 'secret' methods with which to educate deaf learners. He evidently made use of a one-handed manual alphabet system to teach speech, employed a 'natural' method for language acquisition, developed an auditory training programme to augment residual hearing, and developed sense-training techniques which involved the use of sight and touch (Moores 2001: 45,47). This approach would be in keeping with the medical model of educating people to fit into the major hearing society.

In contrast to this approach the Abbé Charles-Michael de l'Epée, a French priest, developed a system of educating the deaf out of concern because the deaf were not receiving the holy sacraments. He founded a school in Paris in 1762 primarily for the education of poor deaf children (milan1880 2010). de l'Epée built up a system of educating the deaf by adapting the sign language practiced by the deaf community in Paris for the purposes of instruction. He was also influenced by the writings of Bonet and the Dutch educator, Amman (Moores 2001:48). de l'Epée was of the opinion that the natural sign language used by the deaf was the most effective and authentic channel for relaying thought and for communicating (McClure, quoted in Moores 2001:48). This philosophy falls within the socio-cultural paradigm. The modified 'methodical' signs developed by de l'Epée as an extension of the natural sign language, which were based on the Spanish manual alphabet system, were used to expand the vocabulary and adjust the signs to suit French grammar and morphology. Writing was given preference over speech because de l'Epée considered the teaching of speech a low-priority, laborious, mechanical process; although he was not evidently opposed to it. His methods involved intense drill, practice and memorisation (Moores 2001:48; Moores 2010:22). However, he was criticised, particularly by Pereire and Heinicke, for his lack of attention to articulation and speech reading. The method employed by de l'Epée became known as the French or Parisian method and so the battle between the 'oralists' and the 'manualists 'began (Garnett, quoted in Moores 2001:48). Abbé Sicard, who replaced de l'Epée in 1790, continued to use the same method of instructing the deaf by using natural signs and the manual alphabet (Moores 2001;49).

2.4.1.4 *Germany*

On the opposite end of the continuum was Samuel Heinicke who developed the German method of instruction based on the ideas of oralist Johann Conrad Amman. Amman, who was born in Switzerland but settled in Holland, purported that the articulation of spoken language was the key characteristic that humanity possessed and as such should form the bedrock of the education of the deaf. Heinicke was also opposed to the teaching of letters before the teaching of speech, arguing that pure thought is only accessible through the spoken word (Moores 2001:49-51; Moores 2010:22-23).

John Baptist Glaser, a strong proponent of the German method in favour of the French method, was of the opinion that the use of manual communication coupled with the placing of deaf children in institutions and special schools for the deaf were ''the two greatest deficiencies in education of the deaf'' (Gordan, quoted in Moores 2001:50). The concepts of 'mainstreaming' and 'inclusion' were conceptualised by Glaser who influenced the training of teachers in order to accommodate deaf learners in regular classrooms with their hearing peers (Moores 2001:50).

However, the leading and educator of the deaf in Germany at the time was Frederick Maritz Hill who contended that deaf children should be taught language through the same methods as used with hearing children, with speech being the central focus for all language instruction. He forbade the use of signs or the manual alphabet (fingerspelling), and he restricted the use of gestures to the very young children (Moores 2001:51). In contrast to de l'Epée and Heinecke, both of whom endorsed the bottom-up approach of drill and practice, Hill concentrated on a whole-language approach, and his influence spread across Europe, the United States and Canada (Moores 2010:24).

2.4.1.5 *The United States*

In the United States of America, Thomas Hopkins Gaullaudet founded the Connecticut Asylum for the Deaf and Dumb (now known as the American School for the Deaf) in Hartford, Connecticut in 1817 with Clerc as head educator. Although initially eclectic in his approach to deaf education, Gaullaudet was refused permission by the Braidswoods to study their teaching methods so he opted to go to Paris and study with Abbé Sicard as he had also developed an interest in the French method which encompassed manual communication. There he met with Laurent Clerc who had attended the School for the Deaf under Abbé Sicard and who now taught at the school. Clerc accompanied Gaullaudet back to the United States and Clerc became the first deaf teacher at the first school for the deaf where an English-based sign language, based on de l'Epée's

French method, was developed and employed by Clerc. Although Thomas Hopkins Gaullaudet had the intention of creating a blend of the most effective components of both oral and manual methods, his plans did not come to fruition because his proposals to the Braidwood family were rejected (Moores 2001:59-60,67; Moores 2010:25). Clerc's curricular approach encompassed the use of natural sign, methodical sign, the manual alphabet and writing as modes of communication, the latter being given more emphasis (Moores 2010:25).

In 1857 Edward Miner Gaullaudet, son of Thomas Hopkins Gaullaudet, became the superintendent of the Columbia Institution for the Deaf, Dumb and Blind in Washington, DC. This higher educational institution for deaf people, which was empowered to award College degrees in the liberal arts, subsequently became known as Gaullaudet College and is now known as Gaullaudet University (Lang 2003:15). Although Edward Miner Gaullaudet played a definitive role in establishing oral education in schools and in emphasizing the importance of teaching deaf learners the skills of articulation and lip reading, he embraced a 'combinist' philosophy in that he was strongly in favour of the adoption of a combined oral-manual approach and the preservation of sign language in the instruction of the deaf (Lang 2003:15; Moores 2001:77).

The first schools to embrace the oral method were the New York Institute for Impaired Instruction which is now known as the Lexington School for the Deaf and the Clarke School for Deaf Mutes in Massachusetts, after which prominent oral schools where opened in Boston, Chicago and Providence. Alexander Graham Bell, a central figure in the education of the deaf in American, and a long-time adversary of Edward Miner Gaullaudet, vehemently advocated the oral approach (Moores 2001:72,76,78). Bell provided training in 'Visible speech' at the Boston day school, the Clark school and the American school in Hartford (Bender, quoted in Moores 2001:78). A campaigner of the eugenics movement, Bell believed that hereditary deficiencies which cause deafness could be diminished if congenitally deaf persons where prohibited from intermarrying (Lang 2003:15; Moores 2001:80). Bell endorsed the abolition of segregated schooling, sign language and the instruction of the deaf by deaf educators and his cause was given great impetus by the crushing victory of the oral-only philosophy over the manual method during the Second International Congress on Education of the Deaf held in Milan, Italy in 1880. At this Convention resolutions were passed that led to the advocacy of the 'superior' German method of pure oralism and the demise of sign language. It was declared that the deaf could be integrated into society only if they could communicate via the spoken word. This stance views deafness as a disability and it is not only in keeping with the clinical-pathological paradigm, it is an issue of fundamental human rights. The combined use of speech and signs was slated as being detrimental to the acquisition of skills such as speech reading, speech and the grasping of concepts (Lang 2003:15; Moores 2001:80-81). The resolutions brought about at this Convention

had a profound, pervasive impact on the lives and the education of the deaf, creating the war between the ‘’oralists’, the ‘manualists’ and the ‘combinists’ which has raged on into the Twenty-First Century, with oralism being the dominant approach (Lang 2003:15).

2.4.1.6 *The Twentieth and Twenty-First Centuries*

After the Conference of Milan in 1880, the situation of the deaf and the education of the deaf in Europe, and to a lesser extent in The United States and Canada, declined under the influence of general societal forces, World War I and II, the Great Depression and the Holocaust, until the mid-Twentieth Century (Moores 2001:52). However, during this time numerous educators published their viewpoints on education of the deaf in the *American Annals of the Deaf and Dumb* and by presenting papers at Conferences for the deaf. Additionally, the special education movement, which advocated the integration of deaf learners being accommodated in special classes in mainstream schools, as well as the curriculum movements which advocated active involvement of learners as opposed to passive participants, gained momentum (Lang 2003:15-16).

The decades following World War II also saw an escalation in the oral-manual debate fuelled by the opposing socio-cultural and clinical-pathological perspectives with regard to the education of deaf children. Educational and psychological research, which involved systematic inquiry and comparative studies, raised several pertinent issues concerning the development and the education of deaf children. This resulted in serious discourse with regard to methods of instruction, early childhood experiences, the role of parents, cognitive and social development, as well as the low levels of academic success achieved by deaf children (Lang 2003:16). During the 1960s and 1970s, the growing discontentment with the poor results of oral-only teaching methods resulted in a move towards the Total Communication approach, signing in the classrooms, and the continued expansion of artificial sign systems (Moores 2010:28). Advancements were being made in the field of amplification technology with the evolution of hearing aid technology and the advent of cochlear implants; improvements in the field of medicine saw a sharp drop in widespread aetiologies of hearing loss such as, for example, maternal rubella, and sign languages began to be recognised scientifically as authentic languages in their own right (Lang 2003:16).

Moores (2010:28) points out that during the 1990s, even though natural sign languages were recognised as true languages in some countries, there was a decline in the use of national sign languages and manually-coded English systems in the field of education, coupled with a revival of the aural-oral approach. This author has postulated that this trend may be due to the

revolutionary advancements made in the fields of digital hearing aids and cochlear implant devices, with rapidly increasing numbers of children worldwide being fitted with cochlear implants in particular. Supplementary influences include the advances made in neonatal screening for hearing loss and the increased emphasis on early intervention programmes. This trend has indicated a return to the view that deafness is a deficit which requires remediation and intervention and as such falls within the ambit of the clinical-pathological paradigm. The increasing worldwide trend of accommodating deaf learners in mainstream classes alongside their hearing peers may also be adding thrust to the use of oral communication**.** This is ironic because the contemporary practice of accommodating all learners, despite their barriers to learning, in *inclusive* settings is based on the socio-cultural paradigm.

However, before discussing the concept of inclusion - which was born out of the human right's movement of the 1960s and which gained international impetus during the 1990's culminating in the World Conference on Special Needs Education held in Salamanca, Spain in 1994 – it is pertinent to reflect back on the history of Deaf education within the South African context. There is very little information regarding the history of Deaf Education in Africa.

2.4.2 Historical perspective of Deaf Education in South Africa

2.4.2.1 *Introduction*

Storbeck, Magongwa and Parkin (2009:133) have contended that

> South Africa has a complex history of colonial immigration and rule; local turmoil for power; apartheid; and most recently, democracy for all. The history of Deaf people in South Africa closely mirrors that of the country, where segregation based on race and culture affected both the language development and access to education for Deaf learners.

Due to the diverse nature of the South African population which is composed of Africans, Whites, Coloureds and Asians or Indians, eleven official languages are recognised by the government - nine of these being of African origin and the other two being English and Afrikaans. At this point in time South African Sign Language (SASL) has not been accorded official status even though it is recognised and protected within the framework of a number of legislative and governmental policies such as the South African Constitution and the South African Schools Act of 1996 (Storbeck et al 2009:133).

2.4.2.2 *An overview of the development of Deaf Education in South Africa*

The Dutch were the first settlers to occupy South Africa in 1652. The country was later colonized by Britain in 1806, became a union in 1910, but gained its independence from Britain in 1961 to become the Republic of South Africa. Although the system of apartheid was officially instituted in 1948, the growth of apartheid was seeded decades before during the colonization by the Europeans. This resulted in missionaries being sent to South Africa to initiate schools funded by the churches, with the Dominican Catholics and the Dutch Reformed Church being at the forefront of establishing schools for the Deaf (Storbeck et al 2009:133-134).The education of the deaf in South Africa was thus greatly influenced by educational trends within the international arena, particularly with regard to communication methods.

The Dominican Grimley Institute for the Deaf, under the direction of Bishop Grimley together with the Irish Dominican nuns, was founded in Cape Town in 1863. This multiracial school adopted a manual approach and used Irish signs and the Irish one-handed alphabet as the method of communication and instruction. Then the German Dominican nuns brought with them the German method of instruction based on oralism, in order to instruct the deaf in the same way as their hearing counterparts, thus initiating the methods controversy in South Africa. Hence, the international trend of adopting the evidently superior oral method of instruction as approved after the Milan Congress in 1880, began to permeate the South African schools. This resulted in the marginalisation of sign language, the training of educators in the use of the oral method, and rising discord amongst parents, extended families and within the wider deaf Communities (Storbeck et al 2009:135).

In response to the resolutions passed at the 1880 Milan Congress advocating pure oralism and signalling the demise of sign language, the Dutch Reformed Church opened the Worcester School for the Deaf and Blind in the Western Cape in 1881. In 1884 the German Dominican School for the Deaf – which moved to Johannesburg in 1934 and was renamed the St Vincent School for the Deaf - was opened in King Williams Town in the Eastern Cape. Although both schools had a 'whites only' policy, the Worcester school opted for a combined oral and manual approach, whereas the German school adopted a strictly oral approach. The Nuwe Hoop School for the Deaf, which was established in Worcester (Western Cape) in 1933, accommodated 'coloured' deaf learners and utilised a combined oral-manual approach. The Kutlwanong School for the Deaf, which was the first institution to provide education for Black deaf learners, was opened in Roodeport, Gauteng in 1941. This school adopted a manually-coded hybrid English system of British invented signs which supported a visually-based communication system (Storbeck et al 2009:135-137).

The Nationalist Party government which gained power in 1948 ruled from the stance of segregated, racial development. In accordance with the Bantustan policy of separate development additional schools for African deaf learners were opened in the homelands to cater for the spoken languages of the various ethnic groups. The manual method of instruction, which was deemed the inferior approach at the time, was used in these schools. However, the seemingly superior oralist approach was firmly embedded in the exclusively 'Whites only' schools which had the funds to purchase acoustic technology equipment to support aural-oral learning. The Black institutions, which fell under a separate Department of Education, did not have sufficient funds and, therefore were not pressurized into adopting the oral approach in the education of deaf learners (Storbeck et al 2009:136-137).

The mid-1970s saw the rise of the Deaf Rights movements and Deaf activists internationally who lobbied for the rights to sign language, education and Deaf Cultural identity (milan1880 2010). One of the most dramatic demonstrations of Deaf Rights, Deaf Power and Deaf Cultural Identity was the revolution in 1988 at the Gallaudet University in Washington D.C. for students with hearing loss. Student took to the streets in protest of the appointment of a hearing President whereas deaf applicants were not considered for the post. The newly appointed President resigned and was replaced by a President who was deaf (Lynas 1994:62). This revolution impacted particularly on the education of the deaf White learners in South Africa, resulting in the re-emergence of sign language instruction in combination with existing aural-oral programmes (Penn, quoted in Van Dijk 2003:10).

The declaration of a democracy in South Africa in 1994 heralded in a new era with the abolition of apartheid and a renouncement of the policy of segregated schooling. However, due to the legacy of apartheid in respect of teacher training, different Departments of Education, homeland policies and separatist development, schools which cater exclusively for deaf learners are still somewhat racially divided, geographically centred and unequal in terms of facilities available and level of teacher training. Currently there are 47 schools for deaf learners (Storbeck 2009:136).

Within a few years of achieving democratic governance the Department of Education began investigating the system of inclusive education which was internationally driven forward during the UNESCO World Conference on Special Needs Education held in 1994 in Salamanca, Spain. However, before looking at the concept of inclusion within the South African policy framework, it is pertinent to define the concept of inclusion as an international trend.

2.5 DEFINING INCLUSION AND INCLUSIVE EDUCATION

2.5.1 Inclusion as an international trend

2.5.1.1 *Introduction*

> Underpinned by the philosophy that all students belong and can learn in regular schools and classrooms, inclusive education is one of the most dominant and controversial issues confronting educational policy-makers and professionals around the world today (Mitchell 2005:xiv).

The concept of 'inclusion' and inclusive education has been a dominant and controversial topic of discussion both nationally and internationally over the last few decades. Although the term '*inclusion*' is not monolithic as it is subject to a variety of definitions by interpretation, and inclusive education per se is subject to diverse implementation, there is a common thread of basic underlying principles (Swart & Pettipher 2007:3). Inclusion is framed within the human rights movement which emphasises the development of social justice for all in a democratic society; educational equity and quality access for all learners; and the commitment of every school to accommodate the diverse learning needs of each and every learner (Dyson, quoted in Swart & Pettipher 2007:3-4). Inclusion is not just about disabilities: inclusion embraces a myriad of student diversities based on race, class, gender, ethnicity, sexual orientation, family background, language, abilities, religion, culture, beliefs and so on (Sapon-Shevin 2007:10).

2.5.1.2 *International policies*

Present international disability policies have developed over approximately 200 years as a result of the thrust of the human rights movement, the recognition of disability inequity and the need for economic, social, political and educational reform. After World War II the United Nations *Universal Declaration of Human Rights*, which asserted that education was a basic human right, was promulgated in 1948 and the concepts of integration and normalisation were instituted. The declaration of education being a fundamental human right was re-affirmed in article 28 of the United Nations *Convention on the Rights of the Child* (United Nations 1989).

The latter part of the 1960s saw an increase in various organisations highlighting the plight of people with disabilities. The rights of persons with disabilities received increasing attention in the United Nations (UN) and other international organisations with the United Nations General Assembly adopting a World Programme of Action in 1982 emanating from the 1981 International Year of Disabled Persons. The emphasis on the rights of persons with disabilities set forward in motion the implementation of numerous international policy documents during the UN Decade of

Disabled Persons (1983-1992), culminating in the use of an international instrument to develop a policy framework of standard rules on the equalization of opportunities for persons with disabilities. Thus, the UN Standard Rules on the Equalization of Opportunities for Persons with Disabilities was ratified by the General Assembly in 1993 as a set of non-compulsory, international customary rules to guide action and policy-making in respect of all persons with disabilities and their organisations (UN enable 2006:1). Rule number 6 targets equal opportunities within the ambit of education by stating that

> States should recognise the principle of equal primary, secondary and tertiary educational opportunities for children, youth and adults with disabilities, in integrated settings. They should ensure that the education of persons with disabilities is an integral part of the educational system (UN enable 2006:4).

Prior to the release of these rules, the Education for All (EFA) movement was launched at the World Conference on Education for All held in Jomtien, Thailand in 1990, culminating in the World Declaration on Education for All – also known as the 'Jomtien Declaration' (Landsberg & Gericke 2006:17). These international policy changes framed within the human rights discourse, spearheaded by the recognition of the rights of persons with disabilities, the need for educational reform and the thrust towards inclusive education, led to a re-conceptualisation of special needs education. This resulted in a shift in the 1970s and 1980s between two radically different major paradigmic perspectives relating to the educational support of learners with disabilities, namely the medical model and the social ecological model (Swart & Pettipher 2007:5).

2.5.1.3 *The medical model*

The medical model, medical deficit or within-child model, which was prevalent from the early 1900s, is based on a model of diagnosing 'what has gone wrong' *within* the learner (intrinsic factors) from a pathological, physiological and or psychological perspective with a view to treating the nature and aetiology of the 'sickness' in an attempt to 'cure' or 'fix up' the learner so that the learner can 'fit into' the prevailing educational system. Learners are assessed and 'diagnosed' in terms of strengths and weakness and how they differ from the 'norm' before being categorised and labelled according to their 'handicaps', 'disabilities' or 'special education needs' (Swart & Pettipher 2007:5). This leads to the gross overemphasis on the learners 'impairments' 'shortcomings', 'failings' or 'deficits', all of which have been measured quantitatively in terms of deficit-specific tests, achievement scores and developmental norms from which these 'impaired' learners 'deviate'. This type of assessment focuses on the assessment *of* the learner and the assessment *of* learning (Bouwer 2007:46,48). Following this diagnostic intervention would be possible placement in separate special schools or classes run by specialist support staff teaching a specialised, 'remedial' curriculum, with the support of additional paramedical experts and

therapists on a ‘pull-out’ system, in the hope of ‘curing’ the learner and placing him or her back in the mainstream (Swart & Pettipher 2007:5). Sapon-Shevin (2007:172), an extreme critic of the medical-deficit model argues that ‘’the segregation of people with disabilities into ‘special’ classrooms and separate lives is justified by paradigms of deficiency and deviance and tragedy’’.

However, reservations about this traditional practice of segregated education began to appear and it was suggested that learners with disabilities were being marginalised, separated from their peers, excluded and denied access, not only from an educational standpoint, but from participating in society as a whole (Green & Engelbrecht 2007:3; Landsberg & Gericke 2006:21). It was advocated that it would be in the learners best interests to be placed back into conventional educational settings by means of ‘mainstreaming’ or ‘integration’ so that they afforded equal educational opportunities (Green & Engelbrecht 2007:3).

2.5.1.4 *Mainstreaming and integration*

Mainstreaming as an educational practice is based on the normalisation principle which emphasises the rights of individuals with ‘handicaps’ to have the same daily routines and life experiences as the rest of society. The aim of mainstreaming is to place learners with disabilities back into mainstream educational settings alongside their normally developing peers for either part of a school day or on a full-time basis depending on the severity of the disability. However, when learners with disabilities ‘earn’ the right to be re-introduced into the mainstream environment they are expected to show evidence that they are capable of successfully completing the same assignments at the same level as the other learners, without any additional support.

Major detractors of the mainstreaming model have argued that this model underpins medical discourse because learners are removed from the mainstream system, ‘fixed up’, and unceremoniously dumped back into the system. It is then incumbent on the learners to ‘fit in’ and adapt to the existing system without the system accommodating their individual needs (Swart & Pettipher 2007:7). This system centres on ‘bringing the child to education’. Sapon-Shevin (2007:5-6) concurs by stating that the guidelines for determining whether a learner can be mainstreamed, is based on the learner’s ability to fit into and compete in the existing regular classroom structure. Since competitive models create winners and losers, the learner is set up for failure. There is little if any burden placed on the educator to modify the learning environment to support the mainstreamed child.

Although integration also involves placing learners with disabilities into existing mainstream class structures, the concept of integration has been driven by humanitarian and civil rights issues and is, as such, based on social and political discourse as opposed to medical discourse. Integration aims to ensure maximum social interactions between normal learners and those with disabilities, driven by more extensive and holistic participation than in mainstream settings. As opposed to mainstream environments where no support is offered beyond that which is given on a day-to-day basis in a regular classroom, integration practices the 'pull-out' system of instruction by additional support services, in separate settings in the regular school (Swart & Pettipher 2007:7). However, neither 'mainstreaming' nor 'integration' is based on the assumption that each and every learner has the unquestionable right to be fully accommodated in a regular school and classroom, and any education system that declares itself to be based within a human rights framework, must be inexorably bound to the principle of *inclusivity* (Green & Engelbrecht 2007:3,5).

2.5.1.5 *Inclusion*

The concept of inclusive education is rooted within the social ecological or social-cultural paradigm which is shaped by political, economic and social transformation and it represents a revolutionary shift from the medical or disability perspective which focuses on exclusion (Green & Engelbrecht 2007:4; Swart & Pettipher 2007:6). Sands, Kozleski and French (2000:14) concur by affirming the need for educational reform as integral to the future well-being of any society. It is required of schools to meet the on-going challenges of today and tomorrow which are based on the rapid changes in our demographic, economic and social foundations. The focus must shift from fitting the learner into the education system to reviewing and transforming the system itself to accommodate the unique and diverse learning needs of all learners within a framework of social justice and equity (Ainscow, quoted in Oswald 2007:140).

Inclusive education extends beyond special needs and disability: it includes conceding that there are other sources of disadvantage and marginalisation such as gender, deprivation, language, ethnicity and geographic isolation. The complex interweaving of these factors and their interactions with disability need to acknowledged as well (Mitchell 2005:2). This ecosystemic perspective acknowledges that there are many external influences related to environmental disadvantage or other factors in the social system that create specific learning needs and impede learning. Lomofsky and Lazarus (2001:306) reiterate that inclusive education philosophy reflects a model of adjustment towards systemic transformation and adaptation in order to accommodate the diverse learning needs of each individual. This is a system of 'bringing education to the child'.

The impact of the 1990 ‘Jomtien Declaration’ was monitored by UNESCO and UNICEF who noted that although several governments had put plans in place to realise targets for literacy and gender equality, very little was being accomplished with regard to the inclusion of learners with disabilities within EFA (Education for All) and this imbalance needed to be redressed. This led to UNESCO and the Spanish government hosting the World Conference on Special Needs Education 1994 in Salamanca, Spain. During this Conference the concept of *inclusion* in education as being quintessential, was given major impetus (Mittler 2005:29).

Salamanca brought considerable advancement to the cause of inclusive education and Education for All (EFA) by reminding governments that learners with disabilities must be included in EFA, and governments should adopt the principle of inclusive education as a rule of law by ‘’enrolling all children in regular schools, unless there were compelling reasons for doing otherwise’’ (Mittler 2005:29).

Thus, grounded in a social perspective, and driven by the need to shift international policy to embrace the Education for All (EFA) movement and to formulate an international framework for action, it was stated that:

- Every child has a fundamental right to education, and must be given the opportunity to achieve and maintain an acceptable level of learning,
- Every child has unique characteristics, interest, abilities and learning needs,
- Education systems should be designed and educational programmes implemented to take into account the wide diversity of these characteristics and needs,
- Those with special education needs must have access to regular schools which should accommodate them within a child-centred pedagogy capable of meeting these needs,
- Regular schools with this inclusive orientation are the most effective means of combating discriminatory attitudes, creating welcoming communities, building an inclusive society and achieving education for all; moreover, they provide an effective education to the majority of children and improve the efficiency and ultimately the cost-effectiveness of the entire education system (UNESCO 1994:viii).

The global movement away from a charity discourse to a human rights discourse also gave shape to policy changes in Africa and South Africa in the early 1990s. However, for the purposes of this study reference will be made to inclusion within the South African policy framework

2.5.2 Inclusion within the South African policy framework

2.5.2.1 *Introduction*

Influenced by international trends during the early 1960s, the South African education system was also based on the medical-deficit model whereby learners were classified according to physical, intellectual and sensory disabilities, and placed in racially segregated special schools which were mostly provided for white children. The early 1980s saw a movement away from labelling and classifying learners according to their intrinsic disabilities to the more comprehensive focus of 'special education needs' and the integration of special education into the mainstream. The early 1990s heralded in a significant reconceptualisation of 'special needs' in education with a paradigm shift away from exclusionary practice towards inclusion based on a social systems model framed within the constructivist approach, driven by revolutionary political change (Lomofsky & Lazarus 2001:305-306).

South Africa experienced a radical socio-political shift when democracy was declared in 1994 and the country entered an era of social, political, economic and educational transformation to redress the imbalances of the apartheid past and develop an egalitarian, non-racial social system (Lomofsky & Lazarus 2001:303). Critical values such as equity, non-discriminatory practice, liberty, respect and social justice were given prominence and formed the bedrock of the Constitution (Swart & Pettipher 2007:16).

2.5.2.2 *Legislation and policies*

Driven by the call of South African inclusive education activists who argued for an education system that would accommodate the learning needs of a diverse range of learners including those with disabilities in the mainstream, the critical values and the principles of inclusive education have been reflected in legislation, policy documents and papers post 1994 (Stofile & Green 2007:54; Swart & Pettipher 2007:16). International guidelines have overarched policy development in inclusive education in South Africa and relevant government initiatives include the following:

- *White Paper on Education and Training in a Democratic South Africa* (Department of Education, 1995a). This document outlined a unified transformational education system encompassing equity of access, non-discrimination, re-dress, respect for and response to diversity, recognition of prior learning, life-long learning, and a new Language Policy which set out the 12 official languages as well as Sign Language (Lomofsky & Lazarus 2001:308-309; Naicker 2005:232).

- *The South African Schools Act* (1996) covered compulsory schooling for all children aged 7-15, the right to choice of placement of 'special needs' children by their parents, access to quality education without discrimination, and the democratic governance of schools by various stakeholders (Lomofsky & Lazarus 2001:309; Naicker 2005:232).
- *White Paper on an Integrated National Disability Strategy* (Ministerial Office of the Deputy President, 1997). This investigation led to recommendations that environments be restructured so that all people with disability are given the opportunity to participate fully in society. In the ambit of education this meant giving additional support in skills training and offering specialised equipment and assistive devices such as sign language and Braille to afford easier access to the curriculum. This reflected a paradigmic shift from the welfare or charity model of disability to the social systems model which is based on the premise that society must adjust in order to accommodate the diverse needs of all its people (Lomofsky & Lazarus 2001:309-310; Swart & Pettipher 2007:17).
- The National Commission on Special Needs in Education and Training (NCSNET) and the National Committee on Education Support Services (NCESS) (Department of Education, 1997b). The government appointed both NCSNET and NCESS to conduct extensive research across all bands and levels of education with regard to 'special needs and support services'. The task was to redress historical fragmentation in these areas and recommend a policy framework to ensure that all learners gain access to a unified education system which offers support, so that every learner may participate fully in daily economic and social life. This culminated in the 1997 report entitled *Quality Education for All: Overcoming Barriers to Learning.* The report recommended that the terminology 'learners with special education needs' which implies exclusion be replaced with learners with 'barriers to learning and development'. The latter implies a reciprocal relationship between intrinsic factors located within the learner and extrinsic factors such as barriers imposed by the school, the education system and even within the wider social, economic and political context. For example, language and communication policy may create barriers to learning when the medium of instruction is different from the home language of the learners. From a deaf perspective additional barriers are created by an environment which does not provide sign language and there is an absence of assistive devices or alternative and augmentative communication (AAC) approaches used to accommodate non-speaking learners – these are systems deficiencies. The NCSNET and NCESS report formed the pillars of the *Green Paper on Emerging Policy on Inclusive Education* 1999 and *White Paper 6: Building and Inclusive Education and Training System* (Department of Education 2001) on the basis of public response to the draft Green Paper (Lomofsky & Lazarus 2001:306,310-313; Naiker 2005:240-241; Swart & Pettiher 2007:16-17). Storbeck et al (2009:140) declares that the abovementioned

report underscored the problems of accessing equal educational opportunities by pinpointing language and communication options as a significant barrier for learners who are deaf and acknowledging SASL as the language of learning and teaching. It also highlighted the need for suitably trained and qualified Deaf teachers. Unfortunately over a decade later many of the items in the report, although still relevant to date, have not been adequately addressed.

- *White Paper 6: Building an Inclusive Education and Training System* (Department of Education, 2001). This document forms the cornerstone of developing an inclusive education and training system in South Africa and it is underpinned by six principles including capacity building and collaboration;, strengthening education support services; expanding provision and access to education; curriculum flexibility, development, assessment and support, assistive devices to support diverse learning needs; programmes to facilitate the shift from 'special needs and support' to an inclusive education and training system, and the provision of funding support (Lomofsky & Lazarus 2001:314). The intent of inclusive education as discussed in the report is to eliminate the barriers that learners with 'special needs' face, by means of adjusting the surrounding learning environment to accommodate these needs and facilitate learning. It must be highlighted that different learning needs result from a variety of both intrinsic and extrinsic factors such as physical, mental, sensory, neurological and developmental impairments, psycho-social disturbances, differences in intellectual ability, particular life experiences or socio-economic deprivation. Additionally, the following barriers, as mentioned in the report, are of particular significance to Deaf learners:
    - Inappropriate languages or language of learning and teaching (LOLT)
    - Inappropriate communication
    - Inappropriate and inadequate support services
    - Inadequately and inappropriately trained education managers and educators (Department of Education 2001:7; Storbeck et al 2009:140-141).

According to Storbeck et al (2009:141), South Africa's national organisation for the deaf, the Deaf federation of South Africa (DeaFSA), responded to White Paper 6 on inclusive education by publishing a position paper delineating the historical and current situation of deaf education in this country. In this paper detailed recommendations were presented centring on the inclusion of deaf learners, teacher training in deaf pedagogy, the use of SASL and the role of deaf assistants and educational interpreters. So how successful has the inclusion policy been as it pertains to learners who are deaf and what are the current Deaf education developments and trends within the South African context?

2.5.3 Current Deaf Education developments and trends within the South African context

> The greatest challenge of all has proved to be bridging the gap between the idealism expressed in policy documents and the realities of education systems that influence the responsiveness of schools and communities to inclusive education (Engelbrecht & Green 2007:82).

In a publication issued by the Human Rights Commission (2006) titled *Report of the Public Hearing on the Right to Basic Education,* DeafSA submitted the following criticisms in respect of inclusive education and learners with disabilities:

- In South Africa, educating deaf learners is centred on a medical approach. This approach focuses on speech training at the expense of education. This results in the lack of a regular curriculum and many deaf persons being functionally illiterate.
- In its experience, the policy contained in the White Paper has not been translated into reality.
- Deaf people are not provided with sufficient opportunities to speak for themselves. Instead they are too often reliant on others who interpret on their behalf
- The department fails to consult and engage sufficiently with the deaf community. In its view, the department should start consulting as they have demonstrated little or no knowledge of deaf education practice, SASL or deaf culture (sahrc 2006:24).

Van Staden, Badenhorst and Ridge (2009:53-54) point out that even though advancements have been made in the endorsement of SASL as the first and natural language of the deaf, and although SASL receives mention in the *Constitution of South Africa* (1996) and various other policy documents, SASL has still not achieved the status of an official language. Furthermore, many deaf learners are being educated in communication modes other than SASL because many educators at Schools for the Deaf are not only unable to sign, but they are of the opinion that Deaf learners should learn the spoken language of the area. It is still not a requirement that these educators attain formal training and qualifications in the education of the Deaf, and most hearing teachers at Schools for the Deaf are not well versed in the pedagogical implications of teaching literacy skills not matter what the mode of communication chosen for instruction. Parkin (2010:491) concurs by stating that ‘’many teachers enter the classroom for Deaf learners with little or no experience with deafness; nor are they required to have any”. Magongwa (2010:495) emphasises that the provision of SASL as a language of learning and teaching without the recognition of SASL as a proper language subject in schools is a challenge because without this provision the learning and teaching of SASL cannot be successfully facilitated. Druchen (2010:496) argues that although several advancements have been made regarding inclusive education and the deaf learner, there remains the need to promote SASL by means of development and training. SASL as a language must be the vehicle for including Deaf learners in

inclusive school environments.

In September 2009, during National Deaf Awareness month DeafSA (Deaf Federation of South Africa) published a leaflet entitled ‘’Deaf Learners & their Education Rights: *Is South Africa Listening?* The following information was highlighted in this pamphlet:

- Diagnosis of hearing loss or deafness happens as late as 4 years old, in some cases 8 years old!
- Deaf children often enter Grade R with little or no language.
- 1 in 10 babies in SA is born with some degree of hearing-loss.
- The average Deaf school-leaver leaves school with a reading age of 8.
- 75% of the Deaf community is functionally illiterate.
- 70% of the deaf Community is unemployed.
- Only 12 schools for the Deaf offer Grade 12 and are concentrated in 3 provinces.
- Only 2 FET Colleges in South Africa employ South African Sign Language Interpreters.
- 600 000 South Africans use South African Sign Language as their primary language.
- Only 14 % of teachers in Schools for the deaf can sign fluently.
- South African Sign Language is not a school subject.

DeafSA put forward the following recommendations to improve the status quo:

- Newborn hearing screening should be LAW as it is in many other countries.
- Early Intervention should be immediately available to parents of children with hearing loss so there are no language delays.
- Early Intervention will ensure the deaf child has a language foundation on which to commence schooling and literacy can progress on grade-level.
- More schools for the Deaf need to be funded and supported to offer Grade 12 which will ensure more Deaf people have a Grade 12 certificate and can enter tertiary education and find employment.
- FET Colleges need to budget for the employment of South African Sign Language Interpreters thus giving Deaf students access to this education pathway.
- Teachers need to receive specialist training in South African Sign Language and Deaf Education.
- South African Sign Language must be implemented as a subject in schools (DeafSA 2009).

Parkin (2010:492-493) asserts that the tasks faced at the macro-level in the education of the deaf in South Africa are by no means small and cannot be addressed instantaneously. Many schools have followed international trends in deaf education resulting in a ‘stop-start-stop-start’ system of

first adopting oralism, then signed English, then Total Communication, then the Bilingual-Bicultural mode of communication. This has caused fragmentation of development and an inability to evaluate any approach critically over an extended period of time. What is needed is cohesive, collaborative leadership formed through a ministerial committee. Education officials, school principals and educators need to appraise the recent research developments in deaf education practice and realise that the goal of educating deaf learners goes beyond teaching them speech skills. The general consensus amongst educators is that early exposure to sign language is detrimental to a deaf child's development of spoken language. However, a vast amount of evidence has come to the fore over the last fifteen years indicating *''that early exposure to a signed language will actually facilitate better speech development later on''* (Parkin 2010:493).

At the XVI World Congress of the Federation of the Deaf hosted in Durban, South Africa, from the 18th to the 24th of July, 2011, Navanethem Pillay – UN High Commissioner on Human Rights – declared that

> Deaf people can't compete in an environment that is not accessible. The failures to recognise sign language, a lack of bilingual education and sign language interpreting have perpetuated the invisibility of people who are Deaf. There is a general unawareness. This prevents deaf people living independently in the community - which is a basic right recognised by the UN convention (Pillay 2011, quoted in DeafSA Newsletter 2011:1).

The status of deaf education in South Africa is an on-going concern, but legislation is in place as a foundation for continued development. Coupled to this development is the need for all stakeholders to understand the barriers faced by deaf and hard-of-hearing (DHH) learners and how to best help overcome these barriers from a pedagogical perspective. In order to evaluate what constitutes best practice in the educational environment of the DHH learner all educators, principals, education policy makers and ministerial commissioners need to investigate the latest research on how deaf children acquire language and develop the literacy skills of speech perception and production, reading and comprehension, written language and its structure and thinking and reasoning skills. This will inform future programme development. This research undertaking aims to evaluate the efficacy of literacy programme in supporting the development of literacy skills in a deaf learner who uses the spoken language approach, and so inform future pedagogical practice.

The research participant, Sally (pseudonym), was initially enrolled at a Centre for Language and Hearing Impaired Children which operates as a pre-school. This school offers a specialised language-rich environment which is centred on listening and speaking in order to promote

expressive oral language. At age 4 she had no spoken language skills and she did not use sign. After 2 years her receptive and expressive skills were still poorly developed so she could not go to a regular mainstream school. Sally attended a remedial school where she followed an individualised learning programme as her parents were opposed to her attending a School for the Deaf where only sign language was used. Sally was subsequently enrolled at a supported mainstream school which embraces inclusive education philosophy. Classes are small, a multilevel, adaptive teaching approach is used and learners straddle the Grades and Phases as they work on individualised education programmes. Multilevel teaching is underpinned by the principles of individualisation, flexibility and inclusion in order to accommodate all learners in classroom activities despite their diversity. To this end collaborative, co-operative teaching strategies are in place.

Sally is the research participant in this study which aims to evaluate to what extent the Teaching, Reading, Writing and Spelling Skills (THRASS) programme – which incorporates the use of the Phoneme Machine with a Cued Speech option – may enhance the literacy levels of an Intermediate Phase learner who is deaf and who uses the spoken language approach. In order to appraise the results of the intervention process as the phenomenon under study and which is underpinned by the development of language skills, it is pertinent to gain background knowledge of how children acquire language and how deafness per se impacts on the ability to acquire language.

2.6 THE CONCEPT OF DEAFNESS AS IT PERTAINS TO LANGUAGE ACQUISITION AND LITERACY

> If education were a monetary system, the currency would no doubt be language (Haynes et al 2006:377).

2.6.1 The nature of language

What is the nature of language? In general terms language may be viewed as a ‘’cognitive activity, a social activity, or a form of learned behaviour, or as a combination of these areas’’ (Paul 2009:5). In respect of the nature of language and language acquisition, Paul (2009:9) contends that there no simple, straightforward definition of language; there is no best way to understand the concept of language; there is no one superior approach that can be used in developing or teaching language and there is no specific test to evaluate language acquisition. However, generally speaking, there are three broad models of language acquisition underpinned by certain basic tenets, namely the environmental, cognitive and social models. However, these models are not mutually exclusive as there are threads of similarities running through them.

2.6.2 Some approaches to language acquisition and language development

2.6.2.1 *The Environmental Model of language acquisition*

The environmental models of language acquisition fall within the behaviourist theoretical framework of learning, with B. F. Skinner being a leading protagonist of this model. Behaviourists are concerned with the interaction between the external or environmental stimuli and the language performance or response of the child to the stimuli because they deem language to be a form of learned behaviour. Thus, with regard to language learning, emphasis is placed on the breaking down of complex entities like words or sentences into a series of basic steps for teaching and learning purposes in which the learners are passive recipients; and the use of repetition or imitation to learn words and the structures of grammar with reinforcement or reward by, for example, praising the successes with a variety of motivators (Paul 2009:6,7). Reading is viewed as a stimulus-response perceptual activity and behaviourists are concerned with word identification via phonics instruction to support word attack skills and with whole-word instruction of sight vocabulary (Pearson & Stephens, quoted in Robertson 2009:36). The Teaching, Reading, writing and Spelling Skills (THRASS) programme is partly based on this bottom-up approach as it is undergirded by the phonographic method to develop literacy skills. Behaviourists believe that reinforcement is necessary to strengthen response (Woolfolk 2007:248). Additionally, they do acknowledge the role played by the internal physiological structures of the mouth, tongue, lips, larynx and so on (articulators) in order to produce speech sounds (Vogel:2006:44). Paul (2009:77) states that the behavioural models support a nurture approach to the learning of language, but they do not offer sufficient explanations of the process of language acquisition. Conventional philosophies on language development hold that the imitation and reinforcement paradigm play a minimal role in the child's production of language (Paul 2009:83).

2.6.2.2 *The Cognitive Model of language acquisition*

Under the influence of Noam Chomsky (nativist theory) linguistic theories have developed which are actually framed within the cognitive model of language development. Cognitive models regard language as being governed by cognitive or biological functions and as being capable of developing without necessarily interacting in the social environment. Human beings are born with the innate potential for language, with a universal grammar which forms the structural basis for language (Paul 2009:6,85). Proponents of the linguistic approach believe that language has grammatical structure that is separate from language use. Diametrically opposed to the behaviourist approach, which supports the idea that grammar rules must be drilled, the linguistic approach purports that grammar-based rules are used unconsciously by a speaker (expressive

language) to formulate an infinite number of sentences, and by a listener (receptive language) to understand what has been spoken (or signed). However, before actual receptive and expressive language develops, a child will initially develop non-verbal and later verbal inner language processes through which his experiences are transformed (Vogel 2006:44). Spoken language underpins the ability to read. According to Frank Smith, a psycholinguist, readers utilise interactive cueing systems such as orthographic, syntactic, semantic and visual cues to make predictions and construct meaning based on prior knowledge. He posited that reading is ''only incidentally visual'', which is in direct contrast to the bottom-up, word identification approach (Robertson 2009:37). Much research and some language teaching materials which are currently in use have been developed for deaf or hard-of-hearing learners based on the psycholinguistic approach (Paul 2009:90). However, deaf and hard-of-hearing children often present with prior knowledge and experience which is limited in scope.

2.6.2.3 *The Social Model of language acquisition*

The social models of language acquisition are also known as the interactionist models or the interactive approach. From an interactionist standpoint the interaction between social, biological, cognitive, environmental, linguistic and other factors are critical for the development of the individual and the acquisition of language. In the ambit of the social models of language acquisition lie three broad approaches: cognitive-interactionist, information processing, and social-interactionist.

Cognitive-interactionists are of the view that the same cognitive processes are responsible for both the child's linguistic performance as well as his linguistic competence (Paul 2009:6). According to Piaget's cognitive theory of language and language acquisition, language is a symbolic system used to express ideas and convey meanings; infants are not born with complex language structures and do not acquire language at birth. Rather, it is the interaction between the child's level of cognitive development and his linguistic and non-linguistic environment that supports the development of language structures by means of assimilation and accommodation of sensory information into existing schemas (Vogel 2006:45).

The information processing paradigm, which is a neo-Piagetian view of cognitive development, has focused on language processing by using the computer as metaphor. Language processing is a continuous developmental process which involves gathering information by paying attention, developing learning strategies, organising the information into existing schemas or encoding it, holding the information in storage units or memory and then retrieving the information when required (Woolfolk:36,250).

Social interactionists such as Lev Vygotsky claim that the distinctive, rule-governed structure of language is acquired as a result of human social interaction by means of a ‘’complex, reciprocal, dynamic interplay between the child and the environment’,’ with both nature and nurture being contributory factors (Paul 2009:6). Conventional language structure is not an inherent ability: it develops in a well-ordered, complex fashion starting with intimate social interaction and guiding conversations with the mother as a critical figure in language development and the child as active participant (Vogel 2007:45).

Yule (1996:175-176) postulates that language acquisition is biologically determined and present at birth because the brain is innately predisposed to acquire language. This is known as the ‘language-faculty’ of the human infant and, as the child grows up in the first two to three years, social interaction with other language-users will stimulate the development of this ‘language-faculty’ without any overt instruction. However, the language that a child learns is not genetically inherited, but is acquired through ‘cultural transmission’ in a specific language-using environment. In emphasizing the need for social interaction as a prerequisite for language development, Yule cites the case where deaf parents of a hearing child exposed the child to a myriad of television and radio programmes in the hope that the child would acquire the ability to speak and understand English, but by the age of three the child had only acquired the gestural language (American Sign language) learnt from his deaf parents. The research participant was exposed to spoken language without any form of gestural language, so she learned to speech read and acquired spoken language through cultural transmission; even the cultural dialect differences prominent in Indian English.

2.6.3 Phases of First Language Acquisition

Yule (quoted in Vogel 2006:48) states that all children develop first language milestones at various stages at approximately the same time as a result of the interplay between biological maturation, the lateralisation process and socio-environmental factors. Yule (1996) described the following developmental phases of language acquisition:

2.6.3.1 *The Prelinguistic Stage*

The pre-linguistic stage ranges within the period of approximately 3-10 months and is characterised by three phases of sound production. At about 3 months, during the cooing phase, the baby makes recognisable sounds using velar (with tongue near soft palate) consonants such as *k* and *g,* as well as high vowels such as *i* and *u.* During the early babbling phase (about 6-8 months) babies produce a number of different vowel and consonant sounds such as fricatives

and nasal sounds. They also produce syllable-like utterances such as *'ga-ga-ga'* and '*ba-ba-ba'*. In the later babbling phase (about 9-10 months) there are recognisable intonation patterns to the consonant and vowel combinations being produced, with increasing variations and complexities in the sound sequences together with the increased usage of nasal sounds such as in '*ma-ma-da-ba-ga'* (Yule, quoted in Vogel 2006:48-49). Thus, during approximately the first year of life, the infant develops the precursors for the language dimensions of form (phonology, morphology and syntax), semantics, and pragmatics (Paul 2009:101).

2.6.3.2 *The Linguistic Stage*

The linguistic stage starts with the one-word or holophrase stage, and falls within the range 12-18 months. Toddlers now begin to utter a repertoire of comprehensible single-unit phrases such as '*cat', 'milk', 'bed'*. These holophrastic utterances may only contain one word, but the word could stand for a phrase or a sentence. For example, the toddler may say '*where*?' or *'there*' (usually pronounced 'dere') to mean '*Where is it*?' or '*There it is*'. The toddler can also associate words with objects, for example, by pointing to a bed and saying the name of the person who it belongs to even if the person is not in the bed (Yule, quoted in Vogel 2006:49).

The two-word stage, which begins from between 18-20 months, is characterised by the ability of the child to combine two words to convey his thoughts. The child's vocabulary moves beyond 50 words, and the two-word combinations such as '*baby chair'*, or '*mommy eat*' are used to communicate with adults who will interpret what the child intends to convey through such expressions. For example, the two-word phase *'baby chair'* could mean that the chair belongs to the baby, or that the baby wants to be put into his chair, or that there is a baby sitting in the chair. The child produces speech (expressive language) and receives feedback (receptive language) from the adult confirming that communication is taking place. It was during this stage of first language acquisition that the research participant became deaf. By the age of two the child's vocabulary has extended to between 200-400 distinct words and he is able to understand 5 times as many words (Yule, quoted in Vogel 2006:49).

During the stage of telegraphic speech (about 2-3 years) the child begins to use sequences of words (lexical morphemes) to produce phases and sentences that include simple prepositions to indicate place (in, on). For example '*daddy in bed'*, or '*mommy go ta-ta'* indicates that the child has developed the capacity to build sentences using the correct word order. By the age of two-and-a-half the child's lexical knowledge has expanded rapidly and by the age of three, the child's level of speech faculty closely resembles that of an adult. However, a child does not acquire language simply by imitating adults; and a child is not simply an empty vessel (tabula rasa) into

which one deposits words and phrases. Although much vocabulary is adopted from the speech he *hears*, the child is actively engaged in trying out and testing language constructions and creating unique, personally constructed expressions (Yule, quoted in Vogel 2006:50).

The use of phonology, morphology and syntax fall within the *form* dimensions of language development which is based on the grammatical structure of speech sounds according to a set of rules (Mercer, quoted in Dednam 2007:121). From about the age of two-and-a-half to three years the child moves beyond the telegraphic phases of using single or root morphemes, and begins to incorporate bound morphemes such as prefixes, suffixes (e.g. baby cry*ing*), and inflectional morphemes such as regular and irregular plurals to denote the grammatical functions of words and to indicate tenses. Although the child may, at first overgeneralise a plural marker (*dogs, cats, foots, feetses*), and he may confuse his usage of the *–ed* inflection for a while, he is generally able to use the various grammatical inflectional morphemes correctly by about the age of four or five (Yule, quoted in Vogel 2006:50).

The syntactic structures of language (the order of words in a sentence) develop over three stages. In stage 1 (18-26 months) the child will add interrogative words or the negative form with a rise in intonation to one or two-word phrases such as ‘’*Where daddy go?”, or ‘’not hungry”.* In stage 2 (22-30months), the interrogative and negative phrases become more complex as in, for example, ‘’*Why you crying*?’’, or ‘’*He no hit you”*. Stage 3 (24-40 months) sees the development of questions and the forming of negatives that are quite close to the adult model as in, for example, ‘’Why doggie can’t sit here?’’, or ‘’he not eating it’’ (Yule, quoted in Vogel 2006:50).

The language dimension of semantics (which involves the knowledge of word meanings and sentences or the vocabulary and contents of a given language), and the language dimension of function or pragmatics (which is the expression of emotions through intonations patterns, gestures and reactions) also develop during the stages of language acquisition. By the time a child is ready for school (over 5 years of age) he is au fait with the form of the language and is able to communicate using a substantial variety of complex language structures, much like that of an adult. During the school years it is mainly the dimension of semantics and the expansion of lexical knowledge that develop further (Yule, quoted in Vogel 2006:42,51).

Looking back at the stages of language acquisition postulated by Yule (1996), it must be borne in mind that the research participant, Sally, was 20 months of age when she lost her hearing faculty. The fitting of digital hearing aids at the age of 2 years and I month was largely unsuccessful and the first cochlear unit was implanted at the age of 4 years and 3 months. Essentially this means that Sally was hearing deprived and, therefore, language deprived during the most critical time for

acquiring language. The telegraphic speech stage of rapid lexical development rooted in phonology and lexical morphology; the development of increasingly complex morphological and syntactic structures; and the expansion of the language dimensions of semantics and pragmatics, were all severely compromised because Sally was unable to listen and speak.

The Environmental, Cognitive and Social Models of language acquisition with their opposing philosophies, and the stages of language acquisition as illustrated by Yule (1996) all centre on acquiring language by listening and speaking during the critical pre-school years. Spoken language may be defined in terms of receptive and expressive components; sensory, cognitive, and motor elements; or in terms of language dimensions such as phonology, morphology, syntax, semantics and pragmatics. Hearing impacts directly on the receptive and sensory components of spoken language processing, as well as on acquiring the phonology of a language. However, the influence of *hearing* on the expressive, cognitive, and motor components of spoken language, which involves both speech reception and speech production, should not be underestimated (Blamey 2003:232).

2.6.4 Speech sound production

2.6.4.1 *Introduction*

It is pertinent for the reader to gain background knowledge of articulation and phonology in speech sound production. The raison d' etre being that the majority of children learn their phonological system through hearing, and hearing loss can have a detrimental effect on the accuracy of speech sound production. Factors such as the level or degree of hearing loss, age of onset, and the type of hearing loss all contribute to the effect of this hearing loss on phonology – the latter referring to both the motor and the cognitive-linguistic aspects of speech sound production (Haynes et al 2006:94).

Haynes et al (2006:89-90,391) emphasise that speech sound production has a motor-based aspect which is the ability to make the correct motor movements to produce speech sounds - this is known as *articulation*. Evidence from the learner profile indicates that the research participant has presented with problems in speech motor planning. Errors of structurally-based articulation may not necessarily have a significant effect on reading, spelling or writing. However, there is also a linguistic rule-based aspect of speech sound production referred to as *phonology*. This refers to the ability to master the rules used in managing the sounds. If a learner's phonological disorder signifies a fundamental problem in the organisation of the sound system, it would be logical to assume that it would metastasize over to other cognitive skills such as reading, spelling

and writing because they are related to the sound system. Brown (2006:41-42) concurs by emphasising that the structure of a child's spoken language will be reflected in the child's written work. Generally speaking, deaf children omit word endings; omit the *s* from plurals; mix tenses; confuse word order; confuse homonyms; omit function words that are not stressed in running speech; confuse or lack knowledge of parts of the verb *to be – am, was, have been;* omit auxiliary verbs – *would/will;* have little knowledge of prosodic (rhythm, stress, intonation) features of spoken language, and have limited knowledge of features that belong only in the written form. These errors have consistently been evidenced in the research participant's written work. Since the distinction between articulation and phonological disorders is often unclear, some authors prefer to use the term *phonology* to refer to both the motor aspect (articulation) and the cognitive-linguistic aspect (phonology) which deals with the rules that govern sound usage (Stoel-Gammon & Dunn, quoted in Haynes et al 2006:90).

Reflecting back on Yule's (1996) supposition that language is acquired through 'cultural transmission' in a specific language-using environment, it must be assumed that social interaction or socio-environmental factors underpin language development. Cognisance must be taken of cultural dialectical differences such as in Indian English because not all speech sound differences constitute a phonological disorder (Haynes et al 2006:91). It must be noted that all major native languages of India lack the dental fricatives (/θ/ and /ð/; spelled with *th*). Additionally, the 'v' in the word 'of' is often pronounced as a 'f', and the 's' is used in place of the 'z'. Although Indian accents vary greatly, it must be borne in mind that there are a number of distinctive features in the pronunciation of consonants in Indian English and the 'errors' of articulation may be due to cultural dialect differences (Wikipedia. The Free Encyclopedia. Indian English 2012). The meaningful sounds of a language are reflective of the structure of the language used in a particular cultural group (Paul 2009:35). However, the research participant has also presented with a phonological disorder because errors in 'articulation' are evident in reading, writing and spelling, but errors may also be a result of dialectical differences influenced by Indian English.

These patterns of errors will thus form an integral part of the data analysis discussion because the manner in which individual phonemes and words are expressed is foundational to reading aloud assessment, although the tests do indicate that allowances must be made in this regard – as has been previously stated, the distinction between articulation and phonological disorders is not always clear-cut. This is of particular importance because the research participant is deaf, uses the spoken language approach and is from the Indian cultural group.

2.6.4.2 *Articulation and phonology in speech sound production*

Articulation may be defined as the physical production of speech sounds by altering the flow of air from the lungs through the movable articulators (lips, mandible, soft palate, larynx and pharynx) and immovable articulators (teeth, alveolar ridge, hard palate). Consonant sounds are distinguished from one another on the basis of how they are articulated (manner), where in the vocal tract the sound is produced by the articulators (place), and whether the consonants are voiced (e.g. *p,t,k)* or voiceless (e.g. *b,d,g*). The consonants can be classified into the following articulatory positions (*place*):

- Bilabial sounds are made between the two lips which are together (p, b, m, w)
- Labio-dental sounds are produced with the upper teeth on the lower lip (f, v)
- Lingua-dental sounds are made with the tongue between the teeth (th [θ, ð])
- Lingua-alveolar sounds are produced with the tongue touching the alveolar ridge which is situated immediately behind the upper front teeth (t, d, s, z, l)
- Lingua-palatal sounds are made between the tongue and the upper hard palate (sh, ch, s [ʒ], j, r, y).
- Lingua-velar sounds are produced with the tongue against the soft palate or velum (k, g, ng [ŋ])
- Glottal sounds are made in the glottis (h) (Haynes et al 2006:54-55).

In respect of the *manner* in which the consonants are articulated – which describes how the airflow is altered - the following variations are classified:

- Plosives or stops indicate that the sounds have an explosive quality because there is a complete stoppage of air at the beginning of sound production with a subsequent sudden release of air (p, b, t, d, k, g)
- Fricatives indicate the forcing of consonant sounds through a narrow or partially occluded opening resulting in a friction noise (f, v, th [θ, ð], s, z, sh, s [ʒ], h)
- Affricatives combine the features of stops or plosives and fricatives (ch, j)
- Nasal sounds are produced when the soft palate or velum is open, thus allowing sound into the nasal cavity to escape through the nose (m, n, ng [ŋ])
- Semivowels are vowel-like, but they are still considered consonants because they are produced with the vocal tract too constricted to be vowels. The *l* and *r* semivowels are referred to as *liquids* or *laterals* because the airstream is allowed to flow without restriction on both sides of the tongue (Davies & Ritchie 1998b:74; Haynes et al 2006:53-54; Vogel 2006:38-39).

Table 2.2: Manner, Place and Voice Characteristics of Consonants

Place	*Plosives or Stops*	*Fricatives*	*Affricatives*	*Nasals*	*Semi-vowels*
bilabial	p, b*			m	w
Labio-dental		f, v*			
Lingua-dental		th (thumb) [θ], th* (feather) [ð]			
Lingua-alveolar	t, d*	s, z		n	l* (liquids)
Lingua-palatal		sh [ʃ], s* (treasure) [ʒ]	ch [t͡ʃ], j (jam) [d͡ʒ)		r* (liquids) y (yawn) [j]
Lingua-velar	k, g*			ing* [ŋ]	
glottal		h			

** indicates voice*

(*Source*: Haynes et al 2006:54)

All vowels are voiced and are classified according to tongue position which can be in the front, centre or the back of the mouth and from a high to low position. However, for the purposes of error analysis in this study the vowels will be classified into the following categories – short vowel monophthongs, long vowel monophthongs and diphthongs (Davies & Ritchie 1998b:74; Haynes et al 2006:52-55). The International Phonetic Alphabet (IPA) symbols are included as these are incorporated as an option in the THRASS Phoneme Machine and are used in dictionaries to illustrate word pronunciation. The IPA vowel sounds and symbols are presented in Table 2.3 below.

The ability to produce speech sounds or articulate from a linguistic, phonological aspect is undergirded by the ability to *hear*, and for a person to be able to hear sound, three elements need to be present. There needs to be a sound source, a conduction mechanism to transport the sound away from the source, and a mechanism to receive the sound. In humans this mechanism is the auditory system (see section 2.2.1). Any dysfunction in this auditory system will affect the ability to produce speech sounds or articulate (Small, quoted in Haynes et al 2006:57-58). Blamey (2003:233) concurs by stating that the influence of *hearing* on the expressive, cognitive and motor components of spoken language should not be underestimated (Blamey 2003:233).

Haynes et al (2006:80-81) cited studies carried out by various authors who studied the age of acquisition of the various phoneme elements. Although these authors did not fully agree on the age of acquisition, their studies did reveal that children do typically develop phonemes in a specific order. The plosives or stops such as p, b, t, d, k and g and the nasals m, n and ng develop early (between the ages of 2 and 4), whereas the consonant fricatives such as f, v, s, sh and s as well as the semi-vowels or liquids develop later (between the ages of 4 and 7).

The above discussion on articulation and phonology in respect of speech sound production has been pivotal for the reader to gain background information in order to appreciate the forthcoming results, observations and error analysis obtained from data gathering, and to identify the emerging patterns.

Table 2.3: IPA Vowel Sounds and Symbols

Short Vowel Monophthongs	Long Vowel Monophthongs (**:** indicates a long vowel)	Diphthongs
æ as in ant	ɑ: as in car	eɪ as in baby
e as in bed	i: as in me	eə as in hair
ɪ as in tin	ɜ: as in fern	ɪə as in ear
ɒ as in frog	u: as in moon	aɪ as in tiger
ʌ as in bus	ɔ: as in fork	əʊ as in nose
ʊ as in book		ɔɪ as in coin
ə as in teacher		ʊə as in moor
u as in actually		aʊ as in cow
		uə as in actual
		iə as in peculiar

(*Source:* Davies & Ritchie 1998b:74; Longman 2009).

The research participant, Sally, contracted meningitis at the age of 20 months and this resulted in her losing the ability to hear. At the age of 4 she was still unable to communicate expressively via spoken language or by gestural language. This has impacted on her ability to produce speech sounds in terms of articulation and phonology, resulting in a profound and pervasive influence on her ability to acquire the dimensions of language and this has, in turn, impacted negatively on the development of her metacognitive and metalinguistic abilities.

2.6.5 Metacognition and Metalinguistics

2.6.5.1 *Metacognition*

> Metacognition refers to both the knowledge that people have about their own cognitive processes and to their intentional use of certain cognitive processes to facilitate learning and memory (Ormrod, quoted in Vogel 2006:51).

When young, children believe that they are able to learn beyond their actual capabilities and, therefore, spend less time processing information and asking questions if the information is unclear. However, as children grow older they become increasingly aware of their metacognitive processes. They slowly realise that there are limitations to their memory in that they cannot recall everything they see or hear. They subsequently recognise what they know and do not know, so they spend more time learning and asking questions. Children also become increasingly aware of how they learn best and they make more use of learning strategies such as planning, organising, repeating and processing (Ormrod, quoted in Vogel 2006:52). A child's quality of attention, his willingness to learn, his prior knowledge and experience, and his conscious use of effective learning strategies are metacognitive skills which influence the ability to learn effectively. Inadequate metacognitive abilities will impact on a child's metalinguistic abilities because the child's ability to use language efficiently is determined by his awareness of the quality of language he is employing and the manner in which he is employing it (Vogel 2006:52). Metacognitive strategies are involved in spoken language, reading and writing (Dednam 2007:121). The research participant has poorly developed metacognitive strategies as she often works impulsively without reflecting back on what has been asked and what she has recorded. She does not always know what she does not know.

2.6.5.2 *Metalinguistics*

Metalinguistics is the ability to understand language and think about how it works. It is explicit knowledge of the language itself (Woolfolk 2007:55). It is a skill which requires the learner to reflect on the dimensions of language, vis-à-vis form (phonology, morphology, syntax) and semantics. If you ask a learner to select the meaning of a word, choose the correct word in a multiple choice item or write the correct form of a specific syntactic structure, you are asking him to think metalinguistically, using his explicit knowledge about the product of the language (Paul 2009:444,451). The research participant has not developed the ability to think metalinguistically in this regard. She battles to write words in the correct form (morphology) and her lexical knowledge is poorly developed. Many errors of syntax are present are present in written expressive language. Metalinguistics generally develops phonologically (awareness of phonemes or

sounds), then syntactically (awareness of structural grammar) and lastly semantically (perceiving the difference between words and what these words symbolise) (Burns, Roe & Ross, quoted in Vogel 2006:52). If this is the case then developing the research participant phonologically should support her development in the dimensions of syntax and semantics.

Examples of the beginnings of metalinguistic development involve manipulating and discussing language, analysing the elements of language, and making decisions about acceptable and unacceptable forms of language. Some children may demonstrate basic metalinguistic skills by the age of 3 years or younger; and by the age of 4 or 5 years numerous children have quite an extensive store of metalinguistic knowledge about words, sentences and speech sounds – knowledge that is key for early literacy development. Segmentation skills (awareness of syllables and phonemes) also begin to emerge at this stage (Paul 2009:102). In order to communicate effectively in language, a person must have an explicit knowledge of the rules of language. Metacognitive processes and metalinguistic awareness are pivotal to the sound development of spoken communication and the later mastery of reading and writing (Vogel 2006:53).

Marschark (2006:4) contends that both deaf and hearing children who begin to read or who present with reading problems are generally lacking in metalinguistic and metacognitive skills. Deaf learners seem to be unable to evaluate their reading comprehension and generally consider that they are good readers (Ewoldt, quoted in Marschark 2006:4).

The questions which now arise are, “How do deaf children acquire language?’’ and ‘’Do deaf children acquire language in the same way as their hearing counterparts?’’ and ‘’What are the components of language learning by deaf children?’’

2.6.5.3 *Language acquisition in deaf and hard-of-hearing children*

> The first years of life are when basic language skills develop, and the first 2-3 years are generally recognized as a critical period for language learning. There is no substitute for natural language learning, and language acquisition that begins at age 3 or 4 is not natural (Marschark & Hauser 2012:44)

Throughout the stages of pre-linguistic vocal and manual babbling, the linguistic phases of first words and signs to the more complex language structures it is evident that the prerequisite for normal language development is the frequency and regularity of communication opportunities between deaf children and the people round them. Whether the communication is spoken or signed is inconsequential. Although deaf children initially babble vocally much like their hearing counterparts, their vocal babbling diminishes in both quantity and variety during the first year of life. Manual babbling may also be evident in deaf children and both manual and vocal babbling

‘’conversations’’ with hearing or deaf parents play a definitive role in contributing to the child’s social, cognitive and language development (Marschark 2009:134).

It is natural for both deaf and hearing children to use gesture in order to identify, request or show things in social situations; and the gestures they employ are astonishingly similar, although deaf children make more use of gesture initially. As they develop towards adulthood both deaf and hearing children develop vocabularies to replace gestures with conventional language. There is no evidence that preventing the use of gesture or early sign language impedes the development of spoken language skills, and it may even be disadvantageous to the child’s ability to acquire language if gesture and early sign are forbidden, especially in young deaf children without cochlear implants (Marschark 2009:135).

Children who are born deaf or acquire deafness at an early age, with severe to profound hearing loss are unable to acquire language through audition, and subsequently have to depend on the visual modality to communicate. It must be emphasised that if the spoken language approach is the chosen method of communication, only 20-30% of speech sounds are visible on the human lips when attempting to speech read – even in dyadic conversations. This is of particular significance in a mainstream setting because it is easy to treat deaf and hard-of-hearing learners in the same way as their hearing counterparts. Children with hearing loss in excess of 60 dB do not generally develop good spoken language skills because normal conversational speech sounds fall into the 40 dB to 60 dB range. (See section 2.2.3 on degrees of hearing loss and the speech banana). Early identification and amplification may ameliorate this to some extent (Schauwers, Gillis & Govaerts 2005:95). However, it must be noted that even with the aid of cochlear units, ‘’the typical child with an implant hears about as well as his hard-of-hearing grandfather’’ (Marschark & Hauser 2012:14). These authors refer to evidence that has suggested that exposing deaf and hard-of-hearing children only to spoken language impedes their language development from early childhood through to the High School years.

Early skills, whether they be through the mode of spoken language or sign language, are predictive of later language development, and as younger children tend to acquire sign language more readily than spoken language, it stands to reason that they would benefit by being exposed to both. Early language development requires early and consistent input, and the hearing parents of deaf children may find that their learning of a sign language will be most valuable and beneficial. However, the needs of each child as an individual with unique circumstances must be addressed within the context of family and the educational system (Marschark 2009:135-136). The research participant was not exposed to sign language as her hearing parents chose the spoken language approach.

The concept of *literacy* involves the strong, reciprocal relationships between spoken language, reading and written language. Whether deaf children acquire language through the vehicle of the spoken word or the signed word, their levels of achievement in this regard will impact on the higher skills of reading and written language. Trezek et al (2010:10) validate this statement by emphasising that conversational language, whether it be spoken or signed, has a crucial, reciprocal relationship with the language of print – language is critical for the development of print literacy (Trezek, Wang & Paul 2010:10). Some research scholars hold the view that reading and writing ought to be discussed together because reading and writing share underlying processes, especially in the emergent literacy phases (Paul 2009:268).

2.6.6 Reading acquisition

2.6.6.1 *Introduction*

Reading may be defined as ''a process of constructing meaning from written texts. It is a complex skill requiring the coordination of a number of interrelated sources of information'' (Ekwall & Shanker, quoted in Dednam 2007:124). Reading is a language process, a cognitive process, a socialising process and an interactive process (Ricket et al, quoted in Dednam 2007:124). Reading involves the incorporation of all the dimensions of language: at first, learners focus on the language dimension of *form* (phonology, morphology, syntax) in order to identify words and sentences in written text, and the dimension of *semantics* (attaching meaning to the written text). The language dimension of *function* (pragmatics) comes into play as the learners' reading ability improves (Dednam 2007:124). Reading is a complex process and various elements are involved in the reading process and in learning to read. The Teaching Handwriting, Reading and Spelling Skills (THRASS) programme focuses on phonology at Word Level One teaching to enhance the skills of word recognition, analysis and synthesis as critical components involved in the reading process.

2.6.6.2 *The components of reading*

Two distinct components are involved in the reading process: *word recognition and analysis* (decoding) and *comprehension* (understanding the message of the text). Proficient readers utilise both components simultaneously and unconsciously whilst automatically identifying words and word series and attributing meaning to these (Vogel 2006:93). The reading framework of Ekwall and Shanker (quoted in Dednam 2007:124-127) encapsulates the reading components during various school levels, but one must keep in mind individual differences and variations of achievement:

(a) Level 1: pre-reading skills (Preschool to Grade One) - at this level children develop phoneme-grapheme correspondence by recognising letter symbols in a variety of fonts, and mapping or associating them to a particular sound and, in so doing, they develop phonemic awareness (Dednam 2007:124). The THRASS programme is pillared by the acquisition of knowledge in respect of phoneme-grapheme correspondence (Alphabetic Principle) to develop phonemic awareness.

(b) Level 2: word recognition, word analysis (decoding), which comprises the form dimension of language; and the understanding of words and ideas which encompasses the dimensions of semantics and pragmatics (Grade One to Grade Four).

Word identification or word recognition involves the instant recognition of basic high-frequency, sight words that appear commonly in all text of a specific language (*he, they, there)* as well as high-frequency words related to an individual's topic of interest. The 500 base words found in Phase Four Stage Ten of the THRASS programme embrace this level.

Word analysis and decoding skills includes the ability to break up words into its structural elements or syllables or further down into letter-sound elements when necessary. Word analysis skills include the use of the following:

- External and internal configuration clues which is the ability to identify a word by means of its external form (***h**at, **m**at)* or internal form (*l**oc**k, l**oo**k).*
- Contextual clues whereby the reader reads the whole sentence in order to identify an unfamiliar word (cloze procedure).

Word decoding skills involve the following processes:

- Phoneme analysis is the decoding of written words into sound units and then synthesizing or encoding the parts to form a spoken word (for example, *c/o/m/p/l/ai/n).* Stage Nine of Phase Two of the THRASS programme deals with keyword analysis or segmentation and Stage Seven focuses on keyword synthesis or blending.
- Structural analysis involves the breaking up of words into syllables or 'chunks'' with each syllable containing a vowel sound. For example, *com/plain* (Dednam 2007:126; Vogel 2006:95-96).

The understanding of words and ideas relates to the message conveyed by the printed word and involves lexical knowledge (vocabulary) and comprehension skills. This is the second distinct component involved in the reading process and incorporates the following:

- Meaningful vocabulary indicates words that the reader understands, whereas utility vocabulary refers to the words that the reader uses. Meaningful vocabulary is generally larger than utility vocabulary because people understand more words than they use in their speaking vocabulary.
- Literal meaning and literal comprehension implies the understanding of written text as it is stated and is generally related to *Who? What? Where? When?*-type questions. Inferential information is not explicitly stated, but it is linked to the underlying meaning of a sentence. It means drawing conclusions by associating the information given in the text (cause) to intuitive information derived from personal experience (effect).
- Evaluation denotes the ability to determine fact form opinion and distinguish between reality and fantasy.
- Appreciation refers to the emotions evoked in the reader whilst reading the written word (Dednam 2007:126-127; Vogel 2006:97-99).

(c) Level 3: reading and study skills (Grade Four onwards)

This involves the use of a dictionary to determine the pronunciation and meaning of a given word. Learners must know the alphabet system and have sufficient lexical knowledge to be able to determine which word in the dictionary pertains to the text being read. Once the reader is able to recognise and comprehend the words in any given text, he is now able to read to learn as opposed to learning to read. As an Intermediate Phase learner, the research participant should be at this level of reading achievement.

Extensive research has been carried out to identify how children learn to read printed text and how they, in turn, process information from the text. Learning to read or the acquisition of reading may be approached in different ways (Dednam 2007:127; Vogel 2006:99).

2.6.6.3 *Approaches to reading acquisition*

Educators and researchers have distinguished three major models of reading instruction to support reading acquisition: the ‘’bottom-up’’, ‘’top-down’’ and ‘’interactive’’ approaches (Norton 2007:7-8).

- The *bottom-up* or text-based approach is influenced by behaviourist theory. This text-based model centres on information provided by the text as opposed to input from the reader’s prior life-world experiences or previous knowledge. Thus, reading commences with the sounding out of single letters to develop sound-symbol relationships (phoneme-grapheme correspondence) and progresses to combinations of letters to form words. The

words are then used to create phrases and sentences, and the sentences are used in paragraphs. For example, the letters *'a', 's', 't', 'c' 'm'* and *'f'* are taught. These letters are combined to form words and word families by means of onset and rhyme, for example, '*c-at', 'f-at' 'm-at'* and *'s-at'.* The words are then used to form phrases such as *'fat cat'* and then sentences and paragraphs, for example '*The fat cat sat on the mat'.* Thus the rules for onset and rhyme and word analysis and synthesis are more important than comprehension. This model is based on the assumption that the mastery of small parts leads to reading competence, with reading problems resulting from the inability to decode the small parts (Norton 2007:8,20). Phonics approaches, such as the THRASS synthetic phonics approach, which teaches sound-symbol relationships using the 44 phonemes, closely resembles the bottom-up model of reading instruction which starts at word level synthesis (part-to-whole learning) as dealt with in Phase Two, Stage Seven of the programme.

- The *top-down* model is a reader-based model whereby each reader utilises his unique concept knowledge, knowledge of language, culture and prior life-world experiences (Vygotsky's sociolinguistic theory and Piaget's theory of cognitive development) in order to interpret text-based material. Thus, this model assumes that the reader has extensive prior knowledge that he can use to support word identification, the meanings of words in context and plot structures. Reading begins as the reader uses background knowledge to generate hypotheses and make predictions about what is being read, by using contextual cues such as letters and words to test these hypotheses, derive meaning and comprehend the text as a whole. The whole language approach is the closest reading approach to the top-down model of reading acquisition (Norton 2007:9,14,20-21). THRASS focuses on whole-to-part learning in Phase Two, Stage Nine of the programme. Whole words are analysed into their constituent parts or phonemes as represented by the corresponding graphemes.
- The *interactive* model is a combination of the bottom-up and top-down approaches to reading instruction. Comprehension of reading material involves the interaction of decoding words and sentences as well as drawing on prior experiences and concept knowledge to make predictions about the text. The majority of researchers and educators endorse this model because it is seen as a balanced approach based on building comprehensive reading skills together with reading comprehension as parallel processes. THRASS may be viewed as a balanced approach because the programme incorporates both part-to-whole and whole-to-part learning. The literature-based approach, which makes use of quality literature as a basis for reading instruction, is closely linked to the interactive model (Norton 2007:9-10,16).

The question now arises that if hearing children acquire reading skills on the basis of their phonological awareness and knowledge of phonics, as well as through their unique concept knowledge, knowledge of language, culture and prior life-world experiences, do deaf children learn the skill of reading in the same way?

2.6.6.4 *Reading acquisition in deaf and hard-of-hearing children*

Investigations have shown a distinct correlation between language deficits and reading disabilities because often ''these language deficits precede and are causally linked to reading problems'' (Catts & Kamhi, quoted in Haynes et al 2006:388). Research findings have consistently indicated that children who are deaf or hard-of-hearing (DHH) continually lag behind their hearing peers quite substantially with regard to reading development, with deaf learners leaving High School reading at levels not much beyond the average 8 to 9 year old, fourth-grade level hearing student (Traxler, quoted in Marschark 2009:165; Trezek & Wang 2006:211). This is known as the fourth-grade plateau phenomenon (Paul 2009:285). Trezek and Wang (2006:202) refer to studies carried out by Allen (1986), and Trybus and Karchmer (1977) which indicate that compared to the approximate 1 year grade level gain for the many hearing students, the annual gain for many deaf and several hard-of-hearing students ranges from 2 to 3 months.

The questions of what constitutes best practice with regard to literacy programmes and how DHH actually acquire reading to become proficient readers are hotly debated topics – are 'mainstream literacy models' really suitable? An abundance of theories regarding both emergent and advanced reading development has resulted in numerous contrasting, discordant views and theories that have been put forward have been misinterpreted because of the on-going debate as to whether DHH students learn to read in a similar way to their hearing counterparts (Paul 2003:97-98). Much of the effort dedicated to educating DHH children with the aim of improving their literacy skills has gone into attempting to teach them the skills and strategies used by their hearing counterparts, even though it is evident that deaf children have different background knowledge and learning strategies to hearing students (Marschark, Convertino & LaRock, quoted in Marschark 2006:3). According to Marschark et al (2002:163), numerous investigations have indicated that deaf readers use a combination of whole-word recognition, phonological (sound-based) recoding, and orthographic (spelling-based) recoding to hold information temporarily in working or short-term memory, much like their hearing counterparts. However, Marschark (2012:102-103) has indicated that the majority of deaf readers have limited knowledge of phonology and they tend to rely more on how printed words look (orthography), even when spelling.

As discussed above the *interactive* model of teaching reading is recommended by the majority of researchers and educators alike because this model is recognised as incorporating a balanced approach based on building the wide range of reading skills concomitantly with reading comprehension as a related processes. One of the most well-known and widely accepted interactive models of reading development is that of Chall's Stage Theory which is briefly outlined below, together with the application to reading and deafness (Trezek, Wang & Paul 2010:28).

- Stage 0: Pre-reading – this stage begins at age 6 months and continues through age 6. The use of spoken language acts as the vehicle for gaining insights into the dimensions of language, including phonemic awareness. Immersion in a literate, print-rich cultural milieu and interaction with adults is vital for this reading readiness stage. The language development of DHH children during this stage will vary significantly depending on their unique circumstances. However, they will already be at a distinct disadvantage when entering school because they have not acquired these pre-reading skills successfully. Spoken language development and vocabulary knowledge is a critical precursor to reading English
- Stage 1: Initial Reading and Recoding – children are typically 6 to 7 years of age and in the first or second grade. The fundamental skill developed in this stage is the mastering of letter-to-sound correspondence, generally taught through direct phonics instruction. Vocabulary is further developed through creating phonetic patterns. The various communication modes used by DHH children may influence their acquisition of phonics skills. However, the failure to successfully map letters to sounds may be a core reason for the reading problems experienced by these children.
- Stage 2: Confirmation and Fluency – children are 7 to 8 years of age and in the second or third grade. The skills acquired in the previous two stages are utilised to advance levels of automaticity and fluency with the decoding and reading of words. Increased exposure to a variety of reading materials develops lexical knowledge. By the end of this stage children are progressing to the point of reading to learn as opposed to learning to read. However, it is at this level that DHH children tend to reach their reading level ceiling because they have not acquired the pre-requisite skills for reading in the earlier stages.
- Stage 3: Reading for Learning – reading to learn in respect of text comprehension gains prominence over learning to read in this stage which is divided into two phases. Phase A relates to children from grades 4 through 6 (Intermediate Phase), and Phase B children are in grades 7 through 9 (senior phase). Most DHH children never progress to Stage 3 or above because they have not acquired the ability to process phonological and other related skills during reading. The research participant was in the Intermediate Phase during this research undertaking.

- Stage 4: Multiple Viewpoints – children aged 15 to 18 in High School who read from a broad range of complex materials, both expository and narrative in nature. Children should be able to tackle various layers of facts and concepts together with multiple viewpoints.
- Stage 5: Construction and Reconstruction – adults at colleges and universities read for their own purpose in order to integrate their knowledge with that of others, synthesize information and create new knowledge (Trezek et al 2010:29-33).

Chall (1996), as quoted in Trezek et al (2010:29,31-33), hypothesized that the stages of reading acquisition as briefly outlined above, develop concomitantly with the stages of cognitive and language development as part of a hierarchical progression. Failure to acquire the necessary skills in any one stage will manifest in delays or even failure of transition to the subsequent phase. Children progress through the phases at different rates as part of an overlapping continuum. These authors conclude that reading acquisition in ''students who are deaf or hard of hearing is qualitatively similar although quantitatively different from that of hearing peers. The major differences might be related to the communication systems they use'' (Trezek et al 2010:33).

Due to the reciprocal relationship between reading and writing, the latter including spelling, the level of DHH children's performance in reading as a receptive skill is reflected in their performance in writing as an expressive skill. Generally speaking deaf children tend to write shorter, simple subject-verb-object sentences, which make their writing appear concrete-bound and literal because they have lags in lexical knowledge and structural grammar or syntax. They frequently omit words in sentences, particularly adverbs, conjunctions, and auxiliary verbs. The average deaf 18-year-old school leaver writes on a level equivalent to that of an eight-year-old hearing counterpart (Marschark 2009:178,181; Marschark & Hauser 2010:109).

> The development of writing in deaf or hard-of-hearing students, similar to reading, seems to proceed at a rate that is not commensurate with that of children and adolescents who have typical reading. This slow rate of acquisition is even slower during the adolescent years (Paul 2009:351).

Wakefield (2006:174-175) advises that deaf children follow different developmental spelling patterns from their hearing peers. The results of studies carried out by Allman (2002:46,59), indicated that whilst hearing children out-performed deaf children in the area of phonemic awareness (an auditory-based skill), deaf learners out-performed their hearing counterparts in the concept of a word and word recognition (visually-based skill). Mayer and Maskos (1998:158) endorse this finding by declaring that although deaf children generally have difficulty attaining reading literacy levels much beyond the fourth grade, they seem to experience relatively less

difficulty in the learning of conventional spelling. They remark that most deaf children become proficient spellers, even though they do not tend to accomplish comparable levels of proficiency in reading and writing. However, several deaf learners show the tendency to use the correct, or near-correct spelling choices (graphemes which represent phonemes), but then they transcribe them onto paper in the incorrect sequence. For example, the word 'forest' is scribed as 'forset', almost like an anagram (Wakefield 2006:174-175).

After reviewing extensive amounts of research in respect of reading approaches utilised in schools, the National Reading Panel (2000) identified five essential elements to reading instruction, namely phonemic awareness, phonics skills, fluency, vocabulary and comprehension. These critical components of reading instruction suggested by the National Reading Panel closely correlate with Chall's Stage Model which highlighted phonemic awareness in Stage 0; phonics in Stage 1; fluency in Stage 2; indirect vocabulary development through Stages 0-3; direct vocabulary instruction at Stage 4; emphasis on text comprehension in Stages 3 through 5 (Trezek et al 2010:34,37).

Vocabulary knowledge is a critical component in the reading and writing process because if a child is unfamiliar with the meaning of the words being read, it impacts directly on the ability to comprehend what is being read. This, in turn, impacts negatively on the quality of written expressive language. Children who are deaf or hard-of-hearing present with a ''reduced size of the vocabulary stock generally, deficiencies in certain categories of words, narrower than normal range of meanings for any given word, and failure to relate inflected and derived forms of words'' (Gaustad 2000:61). Deaf students demonstrate vocabulary knowledge that is quantitatively reduced and the rate at which they acquire new word knowledge is diminished (Luckner & Cooke 2010:38; Marschark & Wauters 2008:332). Marschark and Wauters (2008:331-332) have cited various studies that have indicated the relationship between vocabulary skills and reading comprehension. Paul (2009:288) maintains that there is little doubt that lexical knowledge correlates with reading comprehension. ''Depth and breadth of vocabulary knowledge affects individuals' ability to communicate, to understand what they read, to succeed academically as well as in the world of work'' (Luckner & Cooke 2010:62). It has been observed that deaf readers may be unaware that they do not understand what they are reading because they have limitations in respect of their metacognitive strategies (Marschark & Wauters 2008:334-335).

Bearing the above research in mind, Trezek et al (2010:38) argue that evidence has indicated that one of the major barriers underpinning the lack of progress in reading in DHH individuals is the absence of instruction involving the *phonology* of English as one of the critical elements foundational to reading instruction as identified by the National Reading Panel. They further state that Cued Speech is an efficient way of representing the phonological codes of a spoken

language by providing visual access to spoken language (Trezek et al 2010:56). The aim of this study is to evaluate the extent to which the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme may augment the literacy development of an Intermediate Phase learner who is deaf and uses the spoken language approach. THRASS uses a phonographic approach to develop literacy skills and this approach is in tandem with Stages 1 and 2 of Chall's Stage Model of developing phonemic awareness and phonics as pre-requisite skills for independent reading. A detailed discussion of THRASS will follow in the next chapter.

2.7 SUMMARY OF CHAPTER TWO

The current literature pertaining to the concept of Deafness, education for the Deaf, and language acquisition, with reference to inclusive education has been reviewed in this chapter. The purpose of this literature review has been to provide the reader with the theoretical, contextual framework which underpins this study so that valuable insight may be gained in respect of the research undertaking.

The chapter launched with a definition and description of the concepts of deafness and hard-of-hearing in relation to the anatomical structure of the ear and the mechanisms of hearing. This was followed by a discussion on the classification, aetiologies and degrees of deafness or hearing loss, age of onset, and the resultant effect on communication, audibility and intelligibility of speech sounds. The implications of hearing loss were mentioned in terms of early intervention, academic challenges, socio-emotional and behavioural development, co-morbidity of disabilities, and school placement.

Following on from this was an appraisal of the various assistive devices such as Sound-Field Systems and FM Systems as well as amplification technology devices such as hearing aids and cochlear implants. Particular reference was given to the fitting of multi-channel cochlear implant devices and the resultant implications for education.

The diverse communication options and approaches employed by the deaf and hard-of-hearing (DHH) ensued, and the viewpoints of both the 'oralist' and 'manualist' philosophies were put forward. The two major oral methods were explained, and both the natural and artificial or hybrid systems of manual communication were clarified. Cued Speech as a manual, visual coding system to support auditory-based learning was expounded upon as it is central to this study. This section concluded with a brief debate on what constitutes best practice in respect of language learning and communication options for the deaf or hard-of-hearing.

The communication modes used by the DHH were reviewed from a historical perspective as well. The history of Deaf Education was examined, first from a global standpoint and then within a South African context.

The philosophy of inclusive education as an international and local trend was considered, with the highlighting of international and local policies and the thrust of the Human Rights Movement. Concepts such as the 'medical model', 'mainstreaming', 'integration', 'special needs education' and 'socio-constructionism' were discussed to propel the reader towards the concept of inclusion and inclusive education.

Against this backdrop of inclusion and inclusive education, a discussion of the current Deaf Education developments and trends within the South African context ensued. Reference was given to the criticisms of DeafSA regarding deaf learners in South Africa and their education rights and the recommendations put forward by DeafSA to ameliorate the current situation were visited.

The subsequent section of this literature review involved a discussion on the concept of Deafness as it pertains to language acquisition and literacy – aspects which are keystone to this investigation. The nature of language was defined and various theoretical frameworks describing the concept of language acquisition and language development were discussed. Particular reference was given to the phases of language acquisition posited by Yule (1996).

The succeeding section centred on an explanation of the importance of speech sound production in terms of both the motor aspect of articulation and the linguistic rule-based aspect of phonology. The implications of phonological disorder on higher order cognitive skills were pointed out and a brief description of the articulation of consonants and vowels together with the IPA symbols ensued.

Mention was made of the skills and strategies required for metacognitive and metalinguistic processes and this was followed by an overview of language acquisition in DHH individuals.

Since the concept of literacy involves the reciprocal relationships between spoken language, reading and written language, the next phase of the discussion revolved around the components of reading, approaches to reading acquisition, and Chall's Stage Model in relation to the reading acquisition of the DHH. The importance of phonological awareness and phonics knowledge as critical skills to scaffold reading acquisition and development, as well as the reciprocal skill of writing was highlighted.

The chapter culminated by paying reference to the purpose of this study which is to evaluate the efficacy of the Teaching Handwriting, Reading and Spelling Skills(THRASS) programme in scaffolding the phonological awareness and phonics knowledge, and ultimately literacy development, of a deaf Intermediate Phase learner who uses the spoken language approach.

The THRASS literacy programme is the phenomenon under study in this investigation. The goal of this research undertaking is to evaluate this specific programme as the *case* in this study. The main focus is to observe how the research participant interacts with this programme so that the efficacy of this intervention programme may be appraised. Thus, the following chapter will be dedicated to the THRASS programme so that the reader may gain an in-depth understanding of the phenomenon under investigation.

CHAPTER THREE
THE TEACHING HANDWRITING, READING AND SPELLING SKILLS (THRASS) PROGRAMME

3.1 INTRODUCTION

> A phonetic language such as English requires students, including those who are deaf or hard of hearing, to understand the connection between the phonemes of the language and the graphemes of print (Trezek, Wang & Paul 2010:77).

THRASS, which is an acronym for Teaching Handwriting, Reading and Spelling Skills, is a whole-school picture and associated key word phonics programme for teaching the letters, speech sounds and spelling choices of English to develop knowledge of the fundamental building blocks of phonology. The emphasis of the THRASS programme thus lies in teaching both children and adults of diverse abilities the relationships between the 26 letters of the alphabet (graphs), the 44 speech sounds (phonemes) of spoken English and the 120 spelling choices (graphemes) of written English in order to support and enhance levels of literacy (Davies & Ritchie 1998b:7,10,19; THRASS. n.d. Key facts about THRASS).

The THRASS programme, which is based on the International Phonetic Alphabet, was initially developed during the late 1980s in the United Kingdom by Alan Davies, an educational psychologist, in response to the need to offer remedial support to students with dyslexia/literacy barriers. The Simple Steps Pack was published in 1989; The Handwriting Reading And Spelling System was developed out of this pack in 1992; an updated version of the programme, called The Handwriting Reading and Spelling Sequence, was published in the United Kingdom in 1994. During 1995 Alan Davies was joined by an Australian, Denyse Ritchie, in order to develop THRASS resources and design the THRASS professional development courses. A 'special needs' version of the programme, now called Teaching Handwriting Reading And Spelling Skills (THRASS) was published in 1996. The THRASS programme has continued to develop further with the addition of various resources over the years. The current THRASS programme has both mainstream and ‘remedial’ application in order to facilitate learners in attaining lifelong learning skills. THRASS (UK) Limited and THRASS (Australia) Pty Ltd were joint publishers of the THRASS resources developed by both Alan Davies and Denyse Ritchie until April 2005, after which the resources became developed and administered in various territories. A THRASS ‘15 Minutes a Day X 2’ scheme of work was compiled by Jane Ralphs and Alan Davies and published in 2006 (Davies & Ralphs 2006:n.p.; THRASS. nd.).

Currently the various THRASS resources include the following:

- software such as the Phoneme Machine, THRASS-IT WINDOW (which is also an assessment resource for teachers), SING-A-LONG (with supplementary song books, CDs, colouring-in books, DVDs and sheet music) and the new SOUND-IT-OUT interactive programmes
- charts including the class/desk Picturecharts, Graphemecharts, Overwritecharts and Word Level Workcharts
- magnetic, colour-coded graphemes and spelling tiles – the alphabet tiles are in black, the consonant tiles are in blue and the vowel tiles are in red
- picturecards, 'tumble-turn' phoneme-grapheme cards and 'Hotwords' cards
- workbooks such as the Phoneme-Grapheme Big Book and standard size book, the Picturebook, the 380 Big Book and standard size book, the THRASS 500 Workbook, a THRASS dictionary, a Word level Workbook and the new SOUND IT OUT Workbook
- THRASS 500 Guided Readers and ECHO CDs
- guides including the Teacher's Manual, the '15 Minutes A Day X2' scheme of work, the resources file, the Raps & Sequences CD and the TEACHING THRASS essential guide
- free, downloadable resources for teachers and parents include the Phoneme Machine, Calendar Charts , THRASS Picture Cards Sorting Sheet, THRASS Row, Box and Number Grids, THRASS Profilecards, My THRASS SING-A-LONG Record Book, Spelling Tiles Grid and Grapheme Grid (THRASS. Charts. nd.).

The Phoneme Machine Version 6.1 incorporates the use of human moving lips to pronounce the 44 phonemes of the 500 high frequency base words and the 120 main spelling choices or keygraphemes of English. The Phoneme Machine comprises three sections, namely the Calendar Chart, the Word Grid (WG) featuring the 500 base words and the Phoneme Grid (PG) containing the 120 main consonant and vowel spelling choices of the THRASS Chart. The interactive calendar chart includes voices saying the days of the week, the dates in the month, months of the year, colours, number symbols, number names and letter names. This is an important tool from a South African perspective because it is a free resource which is available in the eleven official languages. It is also available in Asian and European languages. The Word Grid and the Phoneme Grid work in an integrated manner, with human moving lips producing the phonemes. The 500 base words and the 120 keywords of the THRASS Chart can be both analysed (segmented) and synthesized (blended). Coupled to this is the Cued Speech Option which displays the shape, position and movement of hands alongside the lips for simultaneous cueing and lip-reading. This allows the learner who is deaf to gain access to the auditory-based phonology of spoken English, in synchronicity with visually-based cues which are mapped to the visual symbols or orthography of the language. It also includes visual graphics of a Cued Speech

transliterator demonstrating the hand shapes and associated mouth positions to represent the phonemes which make up words. Additional to this is an Auto Function which blends words automatically; a Hide and Seek Function whereby the learner looks for the colour-coded consonant and vowel phonemes boxes that make up a given word; and an IPA Option for associating the International Phonetic Alphabet symbols with the phonemes (THRASS. nd.).

The Phoneme Machine applications are central to this study in order to evaluate to what extent the use of the Phoneme Machine, incorporating the Cued Speech option, may support a learner who is deaf with regard to speech reading ability as well as in the development of phonological awareness in terms of the motor and cognitive-linguistic aspects of speech sound production. The function of the Cued Speech option of the Phoneme Machine is to augment and disambiguate the visual information accessed by speech reading alone, and thus contribute to the development of phonological representations in learners who are deaf or hard-of-hearing. The research participant uses the spoken language approach which relies heavily on speech reading ability in partnership with bilateral cochlear implants to augment residual hearing.

The THRASS programme has been implemented in many schools across the United Kingdom, Australia, Europe, Africa and the neighbouring islands, the Middle East, South and Central America together with the West Indies, the United States of America and Central Asia, including Pakistan, Afghanistan, Turkmenistan, Uzbekistan and Kazakhstan. The University of the Witwatersrand in Johannesburg and the University of Pretoria, both in South Africa, were the first universities, worldwide, to make the two-day THRASS Accredited Certificate a compulsory module for all Foundation Phase student teachers and lecturers, in June 2005 and February 2006 respectively (Davies & Ralphs 2006; THRASS. nd. Key facts).

An in-depth discussion of the current THRASS programme is fundamental to providing the reader with an overall view of the ten features, four phases and ten stages of the programme and this will, in turn, guide the reader in understanding the implementation of the learner support programme offered to an Intermediate Phase learner who is deaf, and who uses the auditory-oral or spoken method of communication. The THRASS programme forms the *case* in this study. It is the phenomenon which will be studied in depth to analyse the extent to which the programme may contribute to educational practice with particular reference to a learner who is deaf and uses the spoken language approach. The aim is to understand the case in depth, in a natural setting, by acknowledging both the complexity and the context of the case (Punch 2009:119).

3.2 THE THRASS PROGRAMME

3.2.1 An overview of THRASS

THRASS makes use of the *phonographic method* to develop literacy skills in learners by increasing their knowledge and understanding about the essential building blocks of literacy, namely the inter-relatedness between the 44 speech sounds (phonemes) of the English language and the way in which these phonemes are represented by graphemes (spelling choices), by using the 26 letters of the alphabet (graphs) either singly or in combinations (orthographic mapping). Essentially, a phonographic programme denotes that learners are taught that the reading process involves converting graphemes into phonemes by 'blending' the phonemes, whereas the spelling process involves converting phonemes to graphemes by 'segmenting' the phonemes (Davies & Ritchie 1998a:3; Davies & Ritchie 1998b:3,10; Davies & Ritchie 2006:10). Thus, the THRASS Whole-picture Keyword Phonics programme is predominantly concerned with Word Level Teaching or the Phonics feature of literacy as opposed to the other two levels involved in literacy education, namely Sentence Level Teaching and Text Level Teaching. The building blocks of Sentence Level Teaching are spoken and written words and the building blocks of Text Level Teaching are spoken and written sentences (Davies & Ritchie 2006:10). It should be noted that the discussion on THRASS as it appears in this chapter is grounded in the research of Davies and Ritchie, and this is the only research available on the structure of the THRASS programme at this time.

The core resource for the phonographic method is the THRASSCHART, specifically the GRAPHEMECHART comprising 44 phoneme boxes. The definitive aim is to scaffold learners to become very familiar and confident with both the layout and the contents of the Graphemechart in particular so that they are capable of analysing and synthesising any words they may come across in written form, and write down less familiar words with confidence by employing reasonable spelling choices – the Graphemechart is used as a frame of reference. The PICTURECHART and the WORDCHART, which incorporate the 120 keygraphemes (60 consonant graphemes and 60 vowel graphemes), are additional resources which may be used as memory aids and bridging tools to support picture/keyword/grapheme association where necessary. For example, at Picturechart level the consonant phonemes 'j', 'g', 'ge', and 'dge' appear in the same box below the keywords 'jam', 'giant', 'cage' and 'bridge' and the associated pictures because these words have the same sound or phoneme (phonology), but have different spelling choices or graphemes (orthography). The purpose of the Graphemechart is to develop in each learner comprehensive phonographic strategies for both reading and spelling. Each chart has letter-boxes at the top displaying the 26 lower-case and capital letters of the alphabet. The next 4 rows on each chart have 24 boxes to represent the 24 consonant phonemes, and the 20

boxes below the bold vowel line represent the vowel phonemes. The Graphemechart is foundational to the Phoneme-Grapheme Principal and it is labelled as the 'periodic table of phonics' because it groups the sound elements of language in much the same scientific way as The Periodic Table groups the elements of matter which make up the universe. The periodic table is used to disambiguate phonics (Davies & Ritchie 1998a:3; Davies & Ritchie 1998b:40; Davies & Ritchie 2006:12).

These phonic elements or 'building blocks' of the THRASS programme are introduced and consolidated by linking the skills areas of handwriting, reading and spelling in a multi-sensory (visual, auditory and kinaesthetic) fashion. This involves learning through a combination of senses by listening to the sounds or phonemes(auditory modality), seeing the symbols or graphemes associated with the sounds (visual modality), writing the symbols, the words or even drawing the associated keyword pictures in, for example, jelly powder (tactile/kinaesthetic learning) and even physically moving around the enlarged shapes of the symbols (kinaesthetic learning). It is a 'hear, see, do' strategy used in teaching also known as the 'VAK' (visual, auditory, kinaesthetic) method, the purpose of which is to facilitate the development of meta-cognitive strategies (thinking skills) and thus cultivate life-long proficiency in word-solving skills. By utilising this multi-sensory approach THRASS focuses on alphabet knowledge; correctly identifying both lower and capital letters by their names; using the alphabet as a resource to build an awareness of the 44 phonemes of spoken English, as well as graphs, digraphs and trigraphs as spelling choices; and using the correct terminology at the onset of the programme. The THRASS programme includes audio tapes, CDs, song books, colouring in books, magnetic letters, cards, printed worksheets, books, charts, software and videos as multisensory resources to develop phonographic strategies (Davies & Ritchie 1998b:9; Davies & Ritchie 2006:14; THRASS. nd. Key facts).

An aspect that must be accorded due consideration in this particular study is that the research participant, Sally, was taught phonics using the traditional approach of 'one-letter-makes-one-sound' during her time spent in the Foundation Phase. Now that she is in the Intermediate Phase, she is going to be *retaught* phonics using the phonographic method which incorporates the 44 speech sounds or phonemes of the English language and the corresponding graphemes represented as graphs, digraphs, trigraphs or quadgraphs.

Reference must also be given to the speech banana illustrated in chapter two (see Figure 2.2) which shows that in order to distinguish the majority of speech sounds requires a hearing loss of approximately 60 dB or less. The research participant initially had a hearing loss of about 57-70dB (moderately severe) in the left ear and around 71-90dB (severe) in the right ear post pneumococcal meningitis. However, her hearing has deteriorated to the point of profound

(>90dB) bilateral hearing loss. Although Sally has been fitted with bilateral cochlear units and is able to speak, speech read and interact fairly successfully in the environment, it will be interesting to observe which phonemes (if any) she may or may not be able to discriminate consistently.

In order for the reader to gain insight into the THRASS programme and how the programme will be approached, a comprehensive discussion on the distinctive features, various phases and stages of the THRASS programme will follow. It must be highlighted that the THRASS programme is essentially targeted at Foundation Phase learners over a four-year period (Grade Reception to Grade Three inclusive). However, the programme may easily be adapted to suit the requirements of learners in any grade or phase or may even be used to support adult literacy development. This is an important feature in respect of this research endeavour.

3.2.2 Characteristics of THRASS

The THRASS programme is characterised by ten distinctive features, four phases and ten stages. The main features include the following:

- From the beginning listening and speaking skills are taught by using 'whole-picture' charts which incorporate pictures, keywords and graphemes together on the same resource material (chart) and not as separate entities.
- The sound units incorporated in the THRASS programme are the 44 phonemes (sounds) of spoken English and the 120 keygraphemes (spelling choices) as opposed to the 26 alphabet letter sounds of the 'traditional' phonics programme.
- The names of both lower-case and capital letters are taught right from the beginning, in contrast to the 'traditional' method where the lower-case letters are linked to single sounds and the capital letters are introduced at a later stage and associated with names.
- From the moment the programme commences educators are able to forge natural links between the phonemes and graphemes on the charts to the learners' unique life-world experiences by selecting words of objects in the surrounding environment, names of people in and around home and school, as well as names of places in the immediate vicinity.
- There is no need for learners to 'convert' from learning that, when reading, one specific lower-case letter says one specific sound (such as 's' for 'Silly Snake') to later on be told that when spelling, the 'c' says 's' in the word 'cease' and that the 'e' at the end of the word 'cease' is not 'e' for 'egg', but it is a 'magic/fairy/silent' letter.

- The pictures, letters, whole-picture charts, grapheme charts, keywords, phoneme boxes and keygraphemes are continually referred to in order to aid memory skills and scaffold the learners' skills of listening, speaking, sequencing, analysing and synthesising in order to develop literacy proficiency.
- The outcomes and assessment standards for each stage and sub-stage may be observed by making use of criterion-referenced tests to measure levels of achievement.
- The programme lends itself to cross-curricular, integrative activity by making phonographic comparisons between words encountered in all the learning areas or subjects. Thus, the keyword 'dolphin' and the grapheme (spelling choice) 'ph' may be linked up to words such as phone, photo, hyphen, graph, alphabet, amphibian, atmosphere, photosynthesis, pharaoh, blasphemy, Ralph – the list is endless.
- With the continued referral to the pictures, letters, whole-picture charts, grapheme charts, keywords, phoneme boxes and keygraphemes across all grades and in all subject areas, the THRASS programme instils life-long word solving literacy skills (phonographic meta-cognition).
- The programme is suitable for developing English literacy levels in people of all ages, with a diverse range of ability levels, and of various language groups (Davies & Ritchie 2006:9).

These ten distinctive features of the THRASS Whole-Picture Keyword Phonics Programme underpin the four phases of the programme as well as the stages and sub-stages within each phase. Since THRASS is essentially a 'whole-school' programme the phases are linked to a four-year scheme of work for schools with Phase One (PI) forming the pillars on which this literacy programme is based.

3.2.3 Phase One of THRASS

Phase One consists of five Stages and the following essential skills of listening and speaking, identifying, sequencing, memory, spatial awareness, peer and self-assessment as well as teaching, cognitive transfer, reading and handwriting form an integral part of the learning outcomes and assessment standards of this phase.

In Stage One (TI Picture Location)) of Phase One the emphasis is on the learner being able to locate and name the letter-boxes and the 120 outline pictures (which provide visual clues to support picture/keyword/phoneme association) on the class Picturechart, which is divided into four rows of consonant picture/keyword/phoneme boxes and four rows of vowel picture/keyword/phoneme boxes separated by a bold vowel line. The class Picturechart may be used to name, describe, talk about and classify the outline pictures; create compound words,

phrases, sentences and stories about the pictures; explore cross-curricular themes to develop vocabulary and explore language elements such as verbs, nouns, adverbs and adjectives. For example, learners may be asked to find all the keywords that would be categorised as 'pets' and this theme would then be explored in detail to develop literacy skills. Spatial awareness is promoted by asking children to describe the picture 'above', 'next to' 'to the left or right', or 'below' another picture. The class Picturechart, the desk Picturechart, the colour-coded Phoneme-Grapheme Cards, the Picture cards, the Raps & Sequence tape, CD or book, the 'THRASS-IT' software and the 'SING-A-LONG' and 'SOUND-IT-OUT' software, books or CDs are resources for building up necessary listening and speaking skills by introducing one row at a time to discuss the attributes of the outline pictures and develop lexical knowledge. Thus the learners become familiar with the 'geography' or 'landmarks' of the Picturechart, and, in turn, also develop their memory skills (Davies & Ralphs 2006:1,5; Davies & Ritchie 2006:24-30).

Stage Two (T2) Letter Location is concerned with the learner being able to locate (by pointing directly underneath the given symbol with an index finger) and *name* the lower-case letters and their capitals in the letter-boxes on the class *Graphemechart,* which is the predominant resource around which the programme is based. Both lower-case and capital letters are taught simultaneously as opposed to the 'traditional' method of first teaching the lower-case letters as 26 sounds and then the capitals letters as 26 names. This skill can also be practiced on the class Picturechart, the desk Picturechart, the desk Graphemechart as well as the Raps and Sequence book and the software programmes. The magnetic alphabet/grapheme/letter tiles are used for learners to sort the tiles out of random order into linear sequential order. Life-world, environmental application is promoted by facilitating learners in locating and naming lower-case and capital letters in, for example, their names, names of family members and friends, names of the surrounding streets, newspapers, books, packaging and so on. Children thus learn when to use capital letters and they are also exposed to a variety of letter fonts, sizes and colours (Davies & Ritchie 1998b:40; Davies & Ritchie 2006:32-36).

Stage Three (T3) centres on teaching learners to correctly form both the lower-case and the capital letters identified on the class Graphemechart. This skill is practiced and assessed by tracing over letters on the Overwrite Chart, clicking the start point of letters in the handwriting 'practice and play' section of the THRASS-IT software, tracing over letters on worksheets and overwriting letters on lower-case and capital 'Formation Sheets' and 'Name and Overwrite Sheets' in conjunction with the Raps & Sequence tape or CD. Learners say the names of the letters and, as they trace over them they say the accompanying letter-formation 'rhyme' that describes the letter-formation. Thus, they see the letter shape (visual modality), hear the description of the letter shape (auditory modality) and trace over the letter shape (kinaesthetic re-enforcement). The Graphemechart is used by learners to trace over the lower-case and capitals

in the letter-boxes located at the top of the chart and to strengthen Letter Location skills by tracing over the letters that represent the 120 keygraphemes. In time and with practice, learners will eventually start writing more quickly and progress naturally to generating a joined script/cursive based on Sassoon Primary Infant font. Stage Three is also integrated across the curriculum as in Stage Two by discussing the use of capital and lower-case letters in the environment (Davies & Ritchie 1998b:21,46; Davies & Ritchie 2006:38-43).

The emphasis in Stage Four (T4) Grapheme Location lies in the learner being able to identify, locate and name consonant and vowel graphs, digraphs and trigraphs, collectively known as graphemes. A graph is a one-letter spelling choice where one letter represents one phoneme. For example, the word 'hat' consists of three phonemes and three graphs (h-a-t). A digraph is a two-letter spelling choice where two letters denote one phoneme. For example, the word 'chick' comprises a digraph 'ch', a graph 'i' and another digraph 'ck' (ch-i-ck). A trigraph comprises a three-letter spelling choice where three letters correspond to one sound or phoneme such as in the word 'edge' which contains the graph 'e' and the trigraph 'dge'. A quadgraph would consist of a four-letter spelling choice such as in the word 'weigh' which has two sounds, 'w' and 'eigh'; the first sound representing a graph and the second sound indicating a quadgraph. Since a quadgraph is not represented on the Graphemechart, this grapheme would be placed in the Grapheme Catch-All (GCA) indicated by an asterisk in the phoneme-box containing the 'a', 'a-e', 'ai' and 'ay' as in 'baby', 'tape', 'snail' and 'tray' in vowel row 1. The various class, overwrite and desk charts, magnetic grapheme tiles, phoneme-grapheme and THRASS cards, grapheme sorting sheets, Sing-A-Long material and interactive software programme resources are used to scaffold this stage. The cross-curricular environmental application involves locating and naming the graphemes in a variety of print media (Davies & Ritchie 1998b:14-17; Davies & Ritchie 2006:44-49).

Stage Five (T5) is the final stage in Phase One and is concerned with Keyword Location. The primary resources for this phase are the class Picturechart and desk Picturechart. Phoneme-grapheme cards, the THRASS Wordchart, the Raps & Sequence material, the Sing-A-Long material and the software programmes are used for re-enforcement. In this stage learners are required to locate and name the 120 keywords on the chart by using their index fingers to point directly underneath the written words. Once again, themes and language elements are explored. Cross-curricular and environmental application will engage learners in finding the keywords in a variety of reading resources using a variety of fonts (Davies & Ritchie 2006:50-55).

After reviewing the ten distinctive features of the THRASS programme together with the five stages of phase one, it is necessary to consider how this part of the programme may possibly scaffold the literacy development of the research participant as a deaf Intermediate Phase

learner. Firstly, it would probably be unnecessary to teach Sally the names of the lower-case and capital letters in the letter boxes. However, it would be pertinent to support her knowledge base of *when* to use capital letters. Secondly, Sally would have to convert her ready knowledge of the 26 lower-case letters of the English alphabet being linked to single sounds and replace this prior knowledge with the 'new' knowledge of the 44 phonemes and the 120 corresponding graphemes. Thirdly, Sally would not practice the correct formation of both lower-case and capital letters as her handwriting style is well-developed. Fourthly, both criterion-referenced tests and norm-referenced tests will be administered prior to the introduction of the THRASS programme. These base-line assessments, in the form of pre-tests, will establish the levels of literacy development of the research participant, with particular reference to reading and spelling skills. These tests will also be diagnostic in function. The rest of the distinctive features of the THRASS programme together with the stages of phase one will form an integral part in attempting to enhance the literacy levels of this Intermediate Phase learner who is deaf and uses the spoken language approach.

3.2.4 Phase Two of THRASS

Phase Two of the programme begins with Stage Six (T6) Phoneme Location during which the learners are expected to 'locate and articulate' the 24 consonant phonemes and the 20 vowel phonemes, which correspond to the 44 phonemes of spoken English, by using the keygraphemes on the class Graphemechart. The various THRASS resource materials are used to scaffold the learners to achieve the outcomes and assessment standards. Cross-curricular, environmental application would involve the learners locating and articulating the 44 phonemes in words in other learning areas and by using a variety of print media. The concepts of 'rhyme' and 'alliteration' can be explored to increase phoneme awareness. For example, the THRASSWORD snail will rhyme with pail, mail, trail and whale even though the last word has a different 'rime' or spelling (Davies & Ritchie 2006:56-59).

Stage Seven (T7) of Phase Two deals with Keyword Synthesis (blending) and thus encompasses the ability to blend, read and spell the 60 consonant and the 60 vowel keywords in the Phoneme-Grapheme Book which is the core resource for this stage. The use of supplementary THRASS resources to support this learning outcome as well as integration across the curriculum also applies here. The assessment standard indicates that the learner must be able to articulate and point to the phonemes, recognise the graphemes in written words and say the letter names in the Phoneme-Grapheme Book simultaneously with the Phoneme-Grapheme soundtrack in order to demonstrate the ability to blend, read and spell the 120 Keyword graphemes. The ability to blend, read and spell the 120 Keyword graphemes is central to cultivating a sound knowledge of the Phoneme-Grapheme Principal (Davies & Ritchie 2006:64-67).

3.2.5 Phase Three of THRASS

In Phase Three Stage Eight (T8) Keygrapheme Recall, the emphasis lies on the learner's ability to visualise and spell from memory, and in the correct sequence, the 120 Keygraphemes on the class Graphemechart, as well as recall the corresponding keywords on the class Picturechart. A variety of resources and integrative teaching methods are employed to re-enforce the outcomes (Davies & Ritchie 2006:72-73).

Stage Nine (T9) focuses on Keyword Analysis (segmentation), and there are numerous THRASS resources and cross-curricular activities to support this stage. An example of cross-curricular activity would be to analyse words introduced in a natural sciences lesson on pollution. Thus words such as 'atmosphere', 'ozone' 'industrial' and 'greenhouse' may be read, analysed and spelt by using the Graphemechart as a support resource, as well as the THRASS Spelling Procedure to learn how to spell these words. This procedure incorporates specific steps i.e. 'Say the word out loud'; 'Say the names of the letters'; 'Cover the word'; 'Write the word'; 'Check the result'. The THRASS Keyword Reading Test incorporating both consonants and vowels (CV), the THRASS Keyword Spelling Test (CV) and the THRASS Keyword Analysis Test (CV) are used to assess the outcomes of this stage which state that the learner must be capable of reading, spelling and analysing the 120 Keywords on the THRASS charts(Davies & Ritchie 2006:79-85).

3.2.6 Phase Four of THRASS

Phase Four of the programme, which features Stage Ten (T10), is the final Phase and Stage of the programme. As with all other stages this stage forms an integral part of the other stages and is not taught in isolation, but is generally introduced in year two of the programme if the programme is initiated from Grade O or Reception level. The raison d'être of this stage is to make certain that learners become skilled in reading and writing those High Frequency words in written English that do not completely obey the phoneme/grapheme correspondence rules, and which account for approximately 75% of those words we read and write. Only about ten per cent or fifty words listed in the THRASS 500 base words lend themselves to recoding by sound-symbol association. Non-Phonographic Spellings, which are spellings that are not graphemes per se because they either represent more than one phoneme or they are abbreviations, are include in the 500 base words (Dr, Mr, Ms, Mrs). Reading and spelling of the THRASS 500 Base Words is taught progressively and sequentially beginning with the 30 one- and two-letter words; then the 85 three-letter words; followed by the 100 'Hotwords'; moving on to 160 four-letter, 128 five-letter, 35 six-letter words, and, ultimately, the 52 seven- eight- and nine-letter words. Resources used to scaffold this stage include the THRASS 500 Big Books and Guided Readers together with the ECHO CDs, the Reading for Meaning Question & Answer Book, the 380 Big Book and 380 Book

and the Phoneme Machine software. Cross-curricular and integrative outcomes include the ability to recognise, read, spell and analyse base words found in a variety of resources such as readers, magazines, newspapers, advertisements, signs, worksheets, notes and text books in all subjects. The stages order of the programme may be adapted to cater for the range of needs and abilities of older learners and all of the elements of the programme are cumulative (Davies & Ralphs 2006:1,5-6; Davies & Ritchie 2006:11,87-89).

Phases two, three and four of the programme will also be covered with the research participant in an integrated manner as none of the phases and stages are taught in isolation. However, the stage order will be adapted to cater for Sally's (pseudonym) specific needs and abilities. For example, the reading and spelling of the THRASS 500 base words of phase four are taught progressively and sequentially in year two of the programme, starting with the 30 one-and-two letter words. Since the research participant is an Intermediate Phase learner, she may well know how to read and spell many of these 'sight' words. Therefore criterion-referenced pre-tests involving reading and spelling of the THRASS 500 base words will be administered as baseline assessments in order to indicate exactly what Sally can or cannot read and spell.

A most important aspect of the programme is the cross-curricular, environmental application. Generally speaking, learners who are deaf have limitations in respect of lexical knowledge because many key concepts and key vocabulary that they may come across during lessons in various subject areas, fall outside of their life-world experience. Therefore, it is paramount that Sally is introduced to key words and concepts proactively across the curriculum.

It will be pertinent to observe the manner in which the research participant articulates the consonant and vowel phonemes, to see if any patterns emerge which may indicate Sally's ability or inability to discriminate and articulate certain sounds by speech reading and residual hearing alone. Repeating the lessons subsequently with the aid of the Phoneme Machine which uses human moving lips, Cued Speech hand shapes and mouth positions may indicate the extent to which this part of the THRASS programme may offer additional support with regard to helping Sally disambiguate certain speech sounds and increase her phonemic awareness.

In order to alleviate the problem of English not being a phonetic language – this means that letters of the alphabet can represent more than one speech sound (e.g. <u>c</u>ir<u>c</u>le) – the International Phonetic Alphabet (IPA) is used to distinguish phonemes. Each speech sound is represented by a different symbol and these symbols are used in the Cued Speech option of the Phoneme Machine. IPA is used in dictionaries to give guidance on the pronunciation of words (Davies & Ritchie 1998b:74; Haynes et al 2006:53). The dictionary was used extensively by the research participant during the intervention programme.

The raison d'être behind the above detailed discussion of the THRASS programme has been to afford the reader extensive information concerning the programme, so that the reader has knowledge of how the programme may be used to support the literacy levels of an Intermediate Phase learner who is deaf and who uses the spoken language approach. As has been previously indicated, the THRASS programme has been designed to teach reading at the Word Level through the vehicle of phonics. Thus, since the THRASS programme is underpinned by the concept of phonology – and THRASS advocates the simultaneous use of both analytical and synthetics phonics - a discussion of the concept of phonology and the various approaches to teaching phonics is applicable.

3.3 APPROACHES TO PHONICS INSTRUCTION

3.3.1 Introduction

The concept of 'phonology' refers to the sound system or phonemes (smallest units of sound in a word) and the corresponding letters or graphemes that represent the building blocks of any language. Phonology (together with morphology – morphemes are the smallest parts of speech that convey meaning) underpins the development of the ability to distinguish words in text and is fundamental to the cultivation of reading skills. Gaining a tacit or incidental working knowledge of phonological elements is a prerequisite if a person is to develop his or her language ability, and this knowledge is foundational to the concept of phonemic awareness (Paul 2009:19,34).

Phonemic awareness implies knowledge of the rules for manipulating, combining and sequencing sound units or phonemes in spoken syllables and words in order to construct words and sentences effectively, whereas phonics per se denotes an awareness of the rules for phoneme-grapheme association or mapping in order to read and spell words. Phonemic awareness and phonics together (also known as 'alphabetics' or the 'Alphabet Principle') are features of the concept phonological awareness or knowledge (National Institute of Child Health and Human Development [NICHD] 2000; Spencer & Marschark 2010:88). According to The National Reading Panel (2000) in the United States, phonemic awareness and phonics, together with comprehension, fluency and vocabulary development are crucial components of reading instruction.

Phonics instruction is a tool used to support learners with the association or mapping of the consonant and vowel phonemes of a language with the corresponding graphemes or printed letters which symbolise or represent those sounds, and to instruct these learners on the application of this knowledge in order to access written text successfully (Paul 2009:34,278;

Spencer & Marschark 2010:88). Paul (2009:279) states that learners who have not acquired phonemic awareness are at a disadvantage when they attempt to segment and blend unfamiliar words when reading and spelling. Phonics instruction may be offered implicitly by drawing attention to any specific phonic elements as they occur in reading material, or systematically by using a programme that introduces sets of phonic elements explicitly in a specific sequence (NICHD 2000).

Various approaches to phonics instruction include the embedded phonics approach which is underscored by orthographic patterns such as b*ake,* w*ake*, c*ake,* m*ake* encountered in the milieu of everyday, authentic reading experiences – embedded phonics does not begin with phoneme-grapheme relationships, but is taught implicitly by embedding phonics instruction into text reading. Analogy phonics is a method whereby new words are discovered by associating them with words already mastered to create 'word families'. For example, if the word 'cat' is known then learners can read unfamiliar words such as 'vat', 'fat' and 'rat' by identifying the similarity of the rime segment of the unknown words to that of the known word, and then substituting the onsets in each new word. The phonics-through-spelling approach involves learners segmenting and recording the phonemes of spoken words by spelling the words phonemically by applying a set of rules. Synthetic phonics begins with sound/symbol association and blending to form words, whereas analytic phonics involves teaching lists of words that share common letters. All of the above approaches embrace a sequential, systematic instruction of specific groups of phonemic elements and onsets and rimes (De Graaff, Bosman, Hasselman & Verhoeven 2009:318-319; NICHD 2000). For the purposes of this study the *analytic* phonics approach and the *synthetic* phonics approach will be discussed in more detail because THRASS advocates the simultaneous use of both approaches.

3.3.2 The analytic approach

The analytic approach comprises whole-to-part learning as part of a 'whole language' approach whereby learners are taught to analyse lists of whole words which are learnt as sight words, without utilising phonics, in order to discern the parts, and generally commencing with the 'letter sound' found at the beginning of the list of words (Davies & Ritchie 2006:11). Thus, if the learners have been given a list of words such as *said, says, seen, show, some, such* and *sure* as sight words, the educator would ask the learners to listen to the words in order to identify whether the words begin with the same sound, and if affirmative, to name the beginning sound or the onset – the learners would make use of 'analogous reasoning' to accomplish this task. The learners may then be asked to add to the word list by suggesting more words beginning with '*s*' Once the 26 initial sounds have been taught by using a series of alliterative pictures and words, learners are

introduced to medial sounds such as in the words ‘bad’, ‘man’, ‘lass’, ‘map’ ‘Sam’ etc. Then, final sounds are taught such as in ‘nap’, ‘cup’, ‘pop’ etc. Initial consonant blends are then taught, e.g. ’br’, ’cl’, ’sp’, followed by final consonant blends, e.g. ’nt’, ’st’, ’sp’; vowel and consonant digraphs, e.g. ’ee’, ’oa’, ’ch’, ’th’; and silent ’e’, e.g. ’plane’, ’note’. (Dombey 1999:16; Johnston & Watson 2003:2; Norton 2007:151). It must be emphasised that learners will not be expected to blend sounds together from left to right in order to form words - they begin with the whole word and then analyse a part of it. In this approach phoneme-grapheme association is taught *after* reading has commenced because learners first learn to read words by sight in the context of written text such as in graded readers by using the ‘look and say’ approach (Johnston & Watson 2005:2). Bowey (2006:79) points out that this whole-language approach is based on the assumption that learners gain knowledge of phoneme-grapheme correspondence and blending skills *implicitly* and at times incidentally through being exposed to reading activities, rather than by systematic, direct explicit phonics instruction. This approach is the converse of the synthetic phonics approach.

3.3.3 The synthetic approach

In synthetic phonics the sound-symbol relationships are taught explicitly by first using a part-to-whole learning, bottom-up approach so that learners are able to translate letters into sounds and then blend (synthesize) the sounds (parts) from left to right to form whole words, thus learning to read and spell concurrently. For example r-a-n = ran, or ch-i-ck = chick is a blending technique used in reading, whereas segmenting (pulling apart) the sounds in words is used in order to spell. For example ran = r-a-n, or chick = ch-i-ck. Thus ‘reading’ involves converting symbols (graphemes) to sounds (phonemes) by *decoding*, and spelling necessitates changing phonemes to graphemes by *encoding*. Reading in context is generally only taught once learners have mastered the consonant and vowel sounds and blends (Davies & Ritchie 2006:10; Norton 2007:151). An initial sight vocabulary is not established before letter sounds are introduced and learners are taught to manipulate and blend the taught sounds together to form words. Thus, if the phonemes ‘t’, ‘p’, ‘s’, ‘n’ and ‘a’ are taught, the learners can build words such as ‘an’, ‘pan’, ‘tan’, ‘nap’, ‘as’, ‘taps’ etc. Consonant blends are not explicitly taught because they can be read by blending. However digraphs (i.e. a phoneme represented by two letters, such as ’ck’, ’ch’, ’ea’, ’ou’) are taught. (Johnston & Watson 2003:3; Johnston & Watson 2005:3).

The above discussion bears reference to the study because it is important for the reader to understand the concepts of phonology, phonemic awareness, phonics instruction and approaches to phonics instruction. The THRASS programme focuses on the 44 phonemes of the English language and these are the building blocks of Word Level reading instruction. It has also been indicated that phonemic awareness and phonics – known in combination as the ‘Alphabet

Principle' - are two of the five key components of reading instruction. The other elements of vocabulary, comprehension and fluency are directly reliant on the basic building blocks of phonemic awareness and phonics in a manner of circular causality. If the research participant can be supported to further develop her knowledge of phonemic awareness and phonics by interacting with the THRASS programme, it stands to reason that she may possibly also advance in the areas of ready vocabulary knowledge, fluency and comprehension.

3.3.4 The THRASS approach

The THRASS programme design is based on the tenet that both an analytic approach and a synthetic phonics approach should be incorporated simultaneously in a systematic as well as an integrated manner. Part-to-whole learning is emphasised at Stage 7 with Keyword Synthesis and whole-to-part learning is highlighted in Stage 9 with Keyword Analysis. However, learners experience the 120 keywords as 'wholes' and their corresponding keygraphemes as 'parts' at the commencement of and throughout the programme (Davies & Ritchie 2006:11). If a specific phoneme box is being discussed the learners are encouraged to look for and suggest lists of words and word families that have the same orthographic pattern or common letters. For example, if the phoneme box in vowel row 1 which contains the phoneme 'ea' as in 'bread' is being explored, words such as 'head', 'instead', 'thread', 'treasure', 'measure', 'pleasure' may be suggested and these words may be used in phrases, sentences and stories to scaffold vocabulary development and reading ability. The Sing-Along resources are also used to contextualise keywords and key phonemes. The 500 base words are incorporated in story books and are reinforced by reading a variety of materials. The cross-curricular and environmental approach of the THRASS Programme ensures that children experience the systematic, synthetic phonics instruction in an integrated, holistic manner. Advertisements, signs, newspapers, magazines and subject text books are used to read words in context, analyse unfamiliar words, and address the need for authentic reading experience. The reading of a variety of texts fosters reading fluency and promotes text-based comprehension skills. The THRASS Programme can be adapted to accommodate the distinct needs of the learners.

In September 2006 The Department for Education and Skills in the United Kingdom, after reviewing the recommendations of the Rose Report to include 'high quality phonic work' as foundational to the skills of early reading and spelling, released a set of criteria to utilise when assessing the efficacy of any commercially produced phonics programme. The THRASS synthetic phonics programme achieved full marks when reviewed against the given criteria because:

- THRASS uses an integrative, cross-curricular approach
- The programme is built up systematically in scope and sequence through its features, phases and stages whilst addressing all the key phoneme-grapheme correspondences
- The THRASS '15 Minutes a day' scheme of work allows for the programme to be delivered in discrete daily phonics lessons at a rapid pace and generally over a four year period, but also at a rate that is flexible and suits the developmental needs of the learners
- THRASS is underpinned by the synthetic phonics approach whereby learners blend phonemes from left to right when reading and segment words into constituent phonemes when spelling
- THRASS emphasises that blending phonemes together to read words can be reversed by segmenting whole words to analyse the parts (phonemes)
- THRASS is a multi-sensory programme that incorporates visual, auditory and kinaesthetic learning by the use of multi-sensory resources to trace over shapes, interact with software, manipulate magnetic tiles, listen and speak, mime, sing and dramatise
- THRASS emphasises the impact of listening and speaking skills as critical elements foundational to systematic phonics instruction, and reading and writing acquisition
- Clear guidance is given with regard to outcomes and assessments standards and how to assess attainment of these outcomes to inform future teaching and learning strategies
- Guidelines are offered on how to adapt the programme to accommodate learners who experience barriers to learning or who require remediation. The THRASS Phoneme Machine software, which uses the International Phonetic Alphabet pronunciation system together with human moving lips and the option of Cued Speech to demonstrate the 500 high frequency base words, is said to be distinctly beneficial when teaching learners who exhibit speech or hearing challenges, or significant reading disorder (dyslexia). It is also invaluable for English as second language learners (THRASS. nd.).

The role of phonology in developing the literacy skills of a learner who is deaf is one of the sub-questions in this study. The researcher is of the opinion that the THRASS advocacy of utilising both the implicit, analytical phonics approach simultaneously with the explicit, synthetic phonics approach can be of major benefit to the research participant for a number of reasons. Firstly, it may be surmised that because the research participant is compromised in the auditory modality, she may well, of necessity, have a more developed visual modality. The analytic approach of

whole-to-part learning may thus suit her learning style. This falls within the Gestaltist framework of seeing the word as a whole rather than as the sum of its parts. On the other hand, the use of synthetic phonics to develop 'word attack' skills by blending the phonemes from left to right to form whole words is an essential skill because, as this Intermediate Phase learner progresses upwards through the grades and phases, she is going to increasingly come across unfamiliar words in written text in all subject areas. If she has the tools with which to read these unfamiliar words, her text-based comprehension skills and reading fluency may increase to allow for more meaningful reading experiences. The synthetic phonics approach is bent towards the auditory modality. Using both approaches may support this learner in making use of her potential strength (visual modality) to scaffold her weakness (auditory modality). Using both approaches may also augment her ability to make the correct spelling choices in written expressive language.

Consideration also needs to be given to the fact that this research participant was only one year and eight months old (i.e. 20 months) when she contracted pneumococcal meningitis resulting in substantial hearing loss. This indicates that she was in the two-word linguistic stage of language acquisition according to Yule (1996). (See section 2.6.3.2). Thus, she may have been able to utter two-word phrases to convey her thoughts, and her vocabulary may have developed beyond 50 words. However, her ability to develop an extensive vocabulary in those formative years was significantly compromised, and many words and concepts she may encounter throughout her schooling may be beyond her life-world experience. Thus, if she has been empowered to analyse and synthesize words, she may be able to 'attack' unfamiliar words in text more successfully. Lexical knowledge may also be enhanced by building up lists of words and word families that have the same orthographic pattern or common letters and using the words in phrases, sentences and stories.

An additional sub-problem in this study is the role played by the THRASS Phoneme Machine in supporting the literacy development of this Intermediate Phase learner who uses the spoken language approach. The 'THRASS Phoneme Machine' software uses the International Phonetic Alphabet (IPA) pronunciation system together with human moving lips to demonstrate the 500 high frequency base words. The Cued Speech option of the software demonstrates the shapes, movements and positions of the hands in congruence with the associated moving human lips. Additionally, video clips of a Cued Speech transliterator, demonstrating the hand shapes and associated mouth positions to represent the phonemes which make up the 500 base words, is available. The THRASS Phoneme Machine incorporates both the analytical and synthetic phonics approaches and the researcher is of the opinion that, by using this software programme, the research participant may be supported in her ability to analyse and synthesize words, further develop her speech reading skills, and learn Cued Speech together with the IPA symbols to help

her disambiguate phonics.

The above discussion on the approaches to phonics instruction has been fundamental in equipping the reader with background knowledge in respect of the concept of phonology, because the role played by access to phonology to enhance the literacy levels of an Intermediate Phase learner who is deaf and uses the spoken language approach, is keystone to this research endeavour. To place this research, which revolves around the THRASS phonographic programme, within the current zeitgeist, it is pertinent to reflect on the research undertaken and the viewpoints of various researchers and scholars regarding the role played by phonics instruction in supporting the development of language.

3.3.5 Synthetic versus analytic phonics approach

The question as to which approach constitutes 'best practice' in order to build phonological awareness as a critical element in the reading process has been debated over many years. In 1997 the USA's National Reading Panel (NRP), which was established after discussions amongst Congress, the Director of the National Institute of Child Health and Human Development (NICHD) and the then Secretary of Education, was entrusted with evaluating all research-based knowledge surrounding the efficacy of different reading approaches utilised in schools. The NRP distinguished synthetic phonics which uses small phoneme units to segment and blend words by direct, explicit instruction, from analytic phonics which uses larger units of onsets and rimes embedded in text, by indirect, implicit instruction. The meta-analysis demonstrated the critical role played by *explicit, systematic* phonics instruction in augmenting children's achievement in reading, as opposed to receiving little or no phonics instruction; and that the spelling ability of good readers also improved with this instruction. The differences between the phonics approaches were statistically insignificant. However, it was further indicated that systematic, synthetic phonics instruction played a considerable part in developing the reading skills of learners who experience barriers to learning, as well those learners who achieve below standard or who come from low socioeconomic environments. A caveat to this is that although the acquisition of phonics skills is foundational to learning to read, these skills must be supported by the other critical elements which are integral in learning to read such as phonemic awareness, fluency, vocabulary instruction and text-based comprehension skills. Any phonics programme should also be adapted to suit the diverse needs of the learners (NICHD 2000).

Bowey (2006:79) remarked that the whole-language approach, which has prevailed for many years in Australia as well as New Zealand, is an approach based on sound didactic principles because it addresses the concept of literacy in an integrated, holistic manner. However, she

cautions that as children progress through the grades they cannot rely solely on contextual clues to predict unusual words in unfamiliar text. Bowey cites the research carried out by Bowey and Muller (2005), Cunningham et al (2002) and Share (1994, 2004) which indicates that children utilise the strategy of phonological *recoding* to identify atypical words in text-based resources. These research results suggest the need for systematic phonics instruction to be integrated with the whole-language approach (Bowey 2006:82-84).

In 2005, the Australian government released a report titled the 'National Inquiry into the Teaching of Literacy' in which it was highlighted that the purpose of the inquiry was not to contrast the whole-language approach to the phonics approach in the teaching of reading. However, the report underscored the significance of early, direct, systematic instruction in phonics as a pre-requisite for foundational instruction in reading so that children develop proficiency in alphabetic coding. It was further suggested that the bedrock of success in the ability to read lies in the implementation of an integrated approach to reading which incorporates explicit instruction in the elements of 'phonemic awareness and phonics, fluency, vocabulary development and text comprehension'. This is in keeping with the statement made by the NRP (Australian Government, Department of Education Science and Training, 2005:11-14).

In a seven year longitudinal study on the effects of synthetic phonics teaching on reading and spelling attainment, carried out in Clackmannanshire, Scotland, Johnston and Watson (2005:9,14-15) compared and contrasted the analytic approach to phonics instruction to the synthetic approach. They concluded that the synthetic phonics approach had a significant and enduring effect on the learners' levels of attainment in both reading and spelling as opposed to those learners who had initially been taught by the analytic approach, even when the latter approach included training in phonemic awareness. This report was the catalyst that led to the government in England commissioning an independent appraisal into the teaching of early reading, which culminated in what is known as the 'Rose Report' (2006). This report concluded that instruction in systematic, *synthetic* phonics was the optimal way of ensuring that most children would become skilled at reading and writing, and this approach should, therefore, be endorsed in all schools (Rose 2006:5; Wyse & Goswami 2008:691; Wyse & Styles 2007:35).

Wyse and Goswami (2008:695-6) criticised the design of these experiments carried out by Johnston and Watson (2005) as not being "rigorous enough to enable a conclusion about the superiority of one teaching method against the other". They further contended that in order to compare the two approaches to phonics instruction, the research design should have made the distinction as to "whether this teaching occurred in the context of sight words (i.e. analytically) or began from discrete sounds (i.e. synthetically)". They also expressed the concern that the UK

Government followed the recommendations of the 'Rose Report' by changing the way phonics was previously taught in schools, to the synthetic phonics approach – a change that was not validated by empirical research methodology (Wyse and Goswami 2008:706).

In her article titled 'Picking a path through the phonics minefield', Dombey (1999:12) contended that

> The traditional or synthetic approach to phonics is flawed by a misrepresentation of English orthography, a misunderstanding of patterns of children's learning in this area and a failure to recognise that there is much more to learning to read than learning phonics

Dombey challenges the part-to-whole, synthetic phonics approach by stating that the orthographic nature of English is far too complex because it is not a system whereby one letter is simply mapped to one sound. English comprises 40 to 44 phonemes, depending on accent, with many vowel combinations and even unstressed vowel syllables or 'schwas' which do not have specific phonemic identities. She further argues that part-to-whole learning is not the way that children learn to read and is thus an inadequate approach to initial reading. She advocates whole-to-part learning reading by reasoning that reading is first learnt incidentally by recognising whole words, which are encountered every day in the environment, by sight. This learning of whole words precedes the ability to analyse and synthesize words by orthographic mapping of phonemes to graphemes. Dombey also remarks that the reading process is not totally bound by knowledge of phonics and the learning of phonics in isolation does not produce fluent readers. Rather it is through the process of reading that the patterns of phonics become evident. Readers do not rely on phonics alone to read uncommon words found in text - they make use of syntactic, semantic, grapho-phonic, pictorial, bibliographic and contextual cues to work out unfamiliar words (Dombey 1999:12-20).

Goswami (2005:273) suggested that instead of debating which is the superior approach in the teaching of phonics, one should consider that the phonological complexity of any spoken language coupled to the spelling consistency of that language are foundational to reading acquisition. He emphasised that because English displayed vast inconsistencies and irregularities in both reading and spelling, especially with regard to the small phonemic units encountered by synthetic phonics, to use synthetic phonics *exclusively* may result in ineffective recoding of English with the resultant constraint on a child's ability to access authentic text. Cook (2002) as cited in Goswami (2005:281) declared that because English is so orthographically inconsistent, one should take advantage by utilising a balanced and integrated approach to phonics instruction.

The orthographic complexity of English is addressed by the THRASS Programme because it teaches the 44 phonemes of spoken English right at the outset in order to support the

development of phonemic awareness and knowledge of phonics. Thus, children do not have to unlearn the One-Letter-Makes-One-Sound-Method (OLMOSM) and re-learn that the same letter may actually represent a number of sounds depending on the consonants or vowels 'attached' to them. For example, the letter '*o*' sounds different in the words *'frog', 'lion', 'worm', 'nose', 'coin', 'book', 'moon', 'moor', 'fork'* , *'cow'* and *'glove'*. THRASS uses a balanced and integrated approach to phonics by employing both the analytic and the synthetic approaches to phonics instruction *simultaneously* during the programme roll-out. As previously stated, it is the researcher's opinion that the research participant should benefit from this dual approach. However, what are the implications of employing a phonological approach – which is auditory-based learning – with a learner who is deaf?

3.4 THE EFFICACY OF EMPLOYING A PHONOLOGICAL APPROACH WITH LEARNERS WHO ARE DEAF

Moores (2009:337) states that the No Child Left Behind (NCLB) legislation (USA), in keeping with the findings of the National Reading Panel (NRP), promotes the bottom-up, part-to-whole approach to early literacy as opposed to the top-down whole-language approach that once prevailed in education circles, because early introduction to sound-symbol relations scaffolds the achievement of literacy skills. However the extent to which phonological skills plays a part in the instruction of learners who are *deaf* or *hard-of-hearing* is in need of serious discourse.

Leybaert (2003), as quoted in Marschark and Hauser (2009:329), indicated that deaf and hard-of-hearing (DHH) students are able to access phonological codes by accumulating information acquired from a combination of residual hearing, lip-reading, fingerspelling, orthography and kinaesthetic feedback from speech.

Alegria and Lechat (2005:124,132) state that because speech perception is a multimodal, audio-visual activity, an artificial visual system such as Cued Speech, in congruence with lip reading, may be used to elaborate a phonological signal. However, there is insufficient evidence which supports the use of Cued Speech for deaf children learning to read English. This may be because of the irregularity or inconsistency of sound to orthographic correspondence in the English language.

Wang, Trezek, Luckner and Paul (2008:405) concur by stating that research conducted over the last three decades has indicated that learners who are DHH do indeed make use of phonological coding to become skilled readers and this illustrates the need for all educators to include phonologically related skills when teaching reading by direct instruction. However, bearing in mind that the capacity to read requires a circular synchronisation of orthographic, phonological,

meaning and contextual processes, there is a paucity of research to address the *method* of imparting phonological information on to these learners during reading instructional processes. These authors have found that Visual Phonics and Cued Speech are valuable instruction tools for developing phonological knowledge and, in their opinion, these tools may well be the precursor to scaffolding the reading skills of *all* deaf or hard-of-hearing learners. In a study conducted by Trezek and Wang (2006:202,212) it was concluded that, given a one year phonics-based reading intervention programme supplemented by Visual Phonics, kindergarten and first-grade students who are deaf or hard-of-hearing could show improvements in beginning reading skills. Standardised assessments of word level reading scores in the pre-tests and post-tests were statistically significant and the results did not appear to be related to levels of hearing loss.

The Teaching Handwriting, Reading and Spelling Skills (THRASS) literacy programme is the phenomenon under study in this investigation. Standardised tests will be used as pre-tests and post-tests during the one-year, phonics-based THRASS intervention programme centred on Word Level reading skills. This study also intends to measure the extent to which Cued Speech, which is available as an option in the Phoneme Machine software programme, may be used as a visual instructional tool in synchronicity with speech-reading to augment the development of phonological knowledge.

Allen, Clark, Del Giudice, Koo, Lieberman, Mayberry and Miller (2009:338-339) dispute the conclusions reached by Wang and his colleagues, that phonological awareness is a prerequisite for reading skills and comprehension. Allen et al are of the opinion that the conclusions are somewhat exaggerated and that these authors have disregarded the links between early sign language and reading achievement. In a response by Del Giudice, Liebermann and Mayberry it is argued that much of the available research may indicate either no evidence or possibly only an insubstantial correlation between phonological coding and reading in learners who are DHH; and that language ability in general is a stronger predictor of reading skills. Miller also argued that Wang et al have failed to consider the large body of evidence which indicates that the role of phonology in reading has shown a more correlational than causal relationship; that pre-lingual deaf readers in particular process written words in much the same manner as their hearing counterparts; and that it is most often those individuals who have been raised in a purely oralist environment augmented by Cued Speech who display enhanced phonological awareness skills (Allen et al 2009:339-340).

Koo contests the description put forward by Wang and colleagues that Cued Speech is representative of speech at both the syllable level and the phoneme level. Koo emphasises that Cued Speech cannot represent ‘speech’ or ‘sound’ at an auditory or any level because Cued Speech is a *visual* system whereby consonants and vowels are articulated by the use of eight

hand shapes at positions close to the mouth and, as such, cannot denote the syllables of any spoken language (Allen et al 2009:340-341). Clark is critical of the article written by Wang et al because she points out that these authors did not consider how factors such as early exposure to sign language and other early language experiences from a socio-cultural perspective can impact on "basic interpersonal communicative skills" and "cognitive academic language proficiency" which will, in turn, impact on reading acquisition (Allen et al 2009:342). The statements regarding Cued Speech are pertinent to this study since Sally has been raised in an oralist environment and the THRASS programme uses the visual tool of Cued Speech to augment the development of auditory-based phonological awareness.

Paul, Wang, Trezek and Luckner (2009:346-348, 353) counter-claim that Allen and his colleagues have not consulted the contemporary theoretical viewpoints regarding reading acquisition; have not suggested an alternative to the hypothesis that both hearing and DHH learners have qualitatively comparable patterns of reading development and comprehension, which include the components of phonology amongst others; and that there is sufficient research which indicates that the more skilled DHH readers do in fact make use of phonological coding. Paul and his colleagues contend that phonemic awareness, segmenting and blending, on their own or together with phonics, support the understanding of the Alphabet Principle and, as such, are essential elements of early reading success albeit not the only elements necessary for reading comprehension – given that the ultimate purpose of reading *is* comprehension. These authors also clarify the use of Cued Speech and Visual Phonics by stating that they had no intention of advocating these as communication methods – the purpose was to discuss the use of Cued Speech and Visual Phonics as *tools* for the instruction of reading. Paul et al highlight the intervention research carried out by Trezek and Malmgren (2005); Trezek and Wang (2006) and Trezek, Wang, Woods, Gampp and Paul (2007), where the use of both curriculum-based and standardised reading tests validated the utility of "phonics-based reading instruction supplemented by Visual Phonics" (Paul et al 2009:354).

Based on the positive findings of a case study conducted by Syverud, Guardino and Selznick (2009), to evaluate the effectiveness of phonological instruction with an oral-deaf learner, Guardino and colleagues replicated the study using a multiple case study design and a 10-week intervention strategy which incorporated Visual Phonics as an instructional tool. All 6 participants demonstrated gains in phonological decoding skills. Although the results are encouraging, these researchers caution against generalising these findings to the greater population (Guardino, Syverud, Joyner, Nicols & King 2011:562,567,568).

Narr (2008:405,414) reports on a correlation study designed to evaluate the phonological awareness and decoding abilities on a group of DHH students who use visual phonics in a sign-

supported teaching environment. She concludes that reading instruction which incorporates visual phonics (visual modality) may be a viable tool for supplementing literacy instruction because the access to phonological codes at the isolated phoneme and word level gained by students via residual hearing, speech reading cues and supportive speech therapy is not sufficient (auditory modality).

In an intervention study conducted by Bergeron, Lederberg, Easterbrooks, Miller and Connor it was found that DHH children between the ages of 3.10 and 7.10 in oral or oral and signing programmes, who were able to identify spoken words, did gain knowledge of phoneme-grapheme correspondences. These authors conclude that young children who are DHH, and who have the ability to perceive spoken language – even if they are language delayed – are able to develop the critical foundational reading skill of phoneme-grapheme association, which underpins the Alphabetic Principle, by means of explicit "auditory skill instruction with language and visual support" (Bergeron et al 2009:87,88,113,114).

Paul (2003:104) states that the suggestion has been made of the possibility of bypassing word-level or phonological coding processing, and perhaps even syntactic processing, and instead make use of semantic or orthographic processing during reading. In employing non-phonological processing it is assumed that readers can mediate by the use of signs and/or fingerspelling. Goldin-Meadow and Mayberry (2001:224,225) concur by citing research that claims that students who are DHH can develop a high level of reading ability *without* having acquired phonological skills. These authors put forward the idea that students may not require a sound-based phonological code because they may map visually. However, much research evidence indicates that learners who mainly utilise a phonological code are generally better readers than those who rely predominantly on non-phonological coding strategies. In addition, deaf adolescent readers who employ non-phonological coding processes have difficulty with the synchronization of "syntactic and semantic information at the sentence level."

Musselman (2000:26) posits that proficient deaf readers may utilise phonological codes as a *result* of learning to read as opposed to using phonological codes as a prerequisite for the development of reading skills. In contrast Trezek and Malmgren (2005:256) draw attention to research which emphasises the high correlation between the acquisition of phonemic awareness and phonics skills in relation to subsequent reading achievement. They indicate that several studies have supported the hypothesis that DHH students make use of auxiliary systems to develop phonological awareness that do not rely solely on the ability to hear or accurately articulate speech sounds. "To assume that deaf readers lack access to phonology because of their deafness confuses a sensory deficit with a cognitive one". Leybaert (1993) as quoted in Trezek and Malmgren (2005:256) speculated that the cause of the reading problems experienced

by DHH individuals is directly related to our inability to correctly address the phonological elements of reading instruction.

Judging by the conflicting viewpoints on the role of phonology in supporting the literacy development of DHH learners, it seems evident that the jury is still out on the efficacy of employing a phonological approach to reading acquisition with these learners. No matter what approach is employed it remains apparent that the majority of DHH students may only develop a vague knowledge of phonology during their foundational school years, relying more on visual orthographic patterns. However, several DHH individuals do utilise a combination of auditory and visual input in order to develop a phonological code that underpins the development of reading skills (Spencer & Marschark 2010:95). There is a dire need for "extended dialogue – or multilogue – on the development of print literacy in deaf children"

A discussion on the research undertaken and the viewpoints of various researchers and scholars regarding the role played by phonics instruction, with particular reference to the reading acquisition of learners who are DHH, has given the reader an understanding of the necessity, or otherwise, of employing a phonological approach to reading - and indeed language acquisition - with these learners. This is pertinent to the study because the intention is to employ the phonologically-based THRASS programme as a strategy to further advance the literacy levels of an Intermediate Phase learner who is deaf and uses the spoken language approach.

3.5 SUMMARY OF CHAPTER THREE

Chapter Three has been dedicated to an in-depth discussion of the characteristics of the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme as the central focus of this study. A brief history of the THRASS programme, together with the resources available for implementing the programme, was followed by a comprehensive discussion of the ten distinctive features, the four phases and the ten stages around which the programme is developed. This served to orientate the reader to the scope of the THRASS programme which is underpinned by the phonographic method of teaching reading at Word Level.

This was followed by a discussion on the various approaches to phonics instruction and particular reference was given to the analytic and synthetic approaches as both approaches are utilised simultaneously in the THRASS programme. A debate of the synthetic versus the analytic phonics approach ensued and this was linked to the THRASS programme. The chapter culminated with a discourse revolving around the research findings put forward by various authors regarding the efficacy of employing a phonological approach with learners who are deaf.

The next chapter will orientate the reader to the research paradigm in which this study is placed. Research design from both a quantitative and qualitative perspective will be briefly visited after which focus will be applied to case study design. Background information in respect of the research participant and the researcher will be proffered and this will be followed by a discussion on research methodology, and data processing and analysis. The chapter will conclude with an examination of the concepts of validity, reliability and ethical considerations.

CHAPTER FOUR

RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

> Educational research today is marked by three qualities. It is eclectic, dynamic, and essential. By *eclectic,* we mean that many disciplines and schools of thought contribute to educational research. By *dynamic,* we mean rapidly evolving, with new philosophies and methods emerging on a regular basis. By *essential,* we mean necessary, for the optimal development of schooling (Check & Schutt 2012:xv).

The purpose of this chapter is to orientate the reader to the methodological framework around which this study is based. The difference between quantitative and qualitative research design from a paradigmic perspective will be briefly discussed. This will be followed by an examination of case study design within the framework of qualitative research, with particular reference being given to the research participant and the researcher. The research method will then be considered after which the data processing and analysis will be noted. The chapter will culminate with a deliberation of the concepts of validity, reliability and ethical considerations.

4.2 RESEARCH PARADIGM

Prior to the launch of any research endeavour is the decision of how best to orientate the research project in order to provide the framework which will be most suited to furnishing potential answers to the posed research problem statement. Does the problem statement lend itself to quantitative or qualitative research design? Would the researcher need to make use of questionnaires, experiments, or surveys that would quantify data in terms of numbers, attributes or amounts that can be ordered in degrees of magnitude by using statistical procedures for analysis and synthesis? Are the motives for the research based on explanation, description or evaluation? If this is the requirement then a quantitative research design may be most suitable. Quantitative research approaches are linked to positivist and postpositivist philosophy. Positivist philosophy traditionally falls in the ambit of the natural sciences which encompasses the belief that there is an external, objective reality that falls within the realms of universal laws and that can be understood through observation. Postpositivists are of the opinion that although there is an external, objective reality, our understanding of this reality is not only limited because of its complexity, but is also coloured by the biases and limitations of the researchers (Check & Schutt 2012:10-12,15).

Alternatively, would the research problem statement be better served by using a qualitative research design which incorporates methods such as participant observation, intense interviewing, focus group interviewing, the recording of words, pictures or video as data, artefacts, and the interpretation of patterns and themes emerging from the data; resulting in thick narrative description to create meaning? Or would the posed research problem be best approached from a mixed-method design by using both quantitative and qualitative methods? (Check & Schutt 2012:10-12).

The research problem statement put forward in this study speculates on the extent to which the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme – which incorporates the use of a Phoneme Machine with a Cued Speech option – will enhance the literacy levels of an Intermediate Phase learner who is deaf and who uses the spoken language approach. This will involve *evaluation* research because the goal is to determine the effects of an intervention in respect of cause and effect. Thus, evaluation research deliberates on the implementation and outcomes of educational programmes to measure programme effectiveness. Evaluation research can be both quantitative and qualitative (Check & Schutt 2012:10-12).

In this study the researcher utilised both criterion and norm-referenced test scores in order to establish both baseline and summative assessments in order to measure the level of success achieved by the research participant before and after her interaction with the intervention programme. However, qualitative research methods such as on-site participant observation, interviewing, field records and artefact collection have formed the predominance in this study. The quantitative data in this study is used to measure intervention outcomes and the qualitative data is used to give an in-depth description of the research participant, her interaction with the THRASS programme, and the interpretation of the results of this intervention process. Thus, this study may be considered mixed-method design, and methods triangulation refers to the use of the employment of different methods to study a phenomenon (Johnson & Christensen 2004:250).

Mixed-method designs are often the best approach to answering research questions because both quantitative and qualitative methods are used in the same study. This study involves measuring the efficacy of the THRASS literacy programme, which incorporates the Phoneme Machine and the Cued Speech option, in respect of supporting the literacy development of an Intermediate Phase learner who is deaf and who uses the spoken language approach. Therefore, in order to *quantify* the results, it has been necessary to supplement a primarily qualitative study with some essential data from the quantitative paradigm. This has encouraged the production of a more complete set of research questions in order to draw more comprehensive conclusions (McMillan & Schumacher 2006:401). However, McMillan and Schumacher (2006:402) caution

against the liberal trend of using the term *mixed-methods* ''to include any study that has some degree of each method in the research''. These authors are of the opinion that the term should only be used if both qualitative and quantitative methods are used extensively in any particular study. Check and Schutt (2012:239) mention that in order to determine why a new teaching strategy may increase test scores, the mixed-methods approach will ''add unique insights about educational processes that cannot easily be obtained from the primary method used in the investigation''. The use of mixed-method design serves the purpose of enhancing the explanation of the outcomes, although the primary method is qualitative.

Explanations derived from qualitative research are full and in-depth, but are generally based on few cases from limited areas (Check & Schutt 2012:37). Data analysis in qualitative research is primarily an inductive process because the aim is to identify patterns emerging from the data and not to prove or disprove a hypothesis. The research participant is an Intermediate Phase learner who is deaf and who uses the spoken language approach. This narrows or limits the explanation because it would be a rare occurrence to find another learner with the same historical profile and who has undergone the same intervention programme, namely the THRASS literacy programme. Thus it cannot be assumed that the phenomena being studied in a particular setting are comparable to others or that different researchers will interpret information in the same way and develop similar explanations in respect of the phenomena being studied. For this reason this type of research is guided by interpretivist philosophy – philosophy being the stance taken on what represents educational reality (Check & Schutt 2012:10,11).

> Ontologically, the interpretivist paradigm denies the existence of an objective reality independent of the frame of reference of the observer. Rather, reality is mind dependent and influenced by the process of observation (Henning, Van Rensburg & Smit 2005:20).

Interpretivist epistemology is based on the believe that educational reality is a socially constructed phenomenon and that the purpose of educational research is to gain an in-depth understanding of the meanings that people assign to reality; and not to establish the manner in which reality works apart from their interpretations. Falling within the qualitative framework, Interpretivists are of the opinion that each person constructs a unique image of reality based on his own preferences and prejudices, and by his interactions with others in a social context (Check & Schutt 2012:15). The interpretive researcher takes cognisance of the fact that ''observation is fallible and has error and that all theory is revisable'' (Henning et al 2005:19). The researcher will make use of a variety of data and diverse sources as well as analysis methods in order to achieve validity. Since most of our knowledge is gained through social constructions such as language, shared interpretations, consciousness, documents or other artefacts, interpretivist philosophy is framed within the constructivist paradigm (Henning et al 2005:20-21). This

paradigm is underpinned by emphasis given to how diverse stakeholders in educational settings structure their beliefs or truths (Check & Schutt 2012:15).

As an interpretivist researcher I made extensive use of observation as the primary research tool. A variety of data was collected in the form of field records, interviews and artefacts in order to enhance validity. Knowledge was gained primarily through the vehicle of language and interpretation in order to evaluate the efficacy of the THRASS programme as an intervention strategy to enhance the literacy levels of an Intermediate Phase learner who is deaf and who uses the spoken language approach. The THRASS literacy programme was used as the *case study* in this primarily qualitative paradigm and this is the reason for devoting an entire chapter (chapter three) to an in-depth discussion of the programme. However, due to the fact that there is only one research participant in this study, she could also be considered a case in her own right. However, the focus of this study is to evaluate the effectiveness of the THRASS intervention programme as case. Additionally, because the individual practitioner is doing a small-scale 'experiment' to possibly improve local practice, this study may be considered action research to some extent (Gall, Gall & Borg 2005:4).

4.3 RESEARCH DESIGN

4.3.1 Case Study Design

> The definition of case study is certainly not unambiguous. Somehow the term ''bounded system'' usually comes to mind…There are speculations – sometimes I call them foreshadow problems. What the researcher looks for are the systematic connections among observable behaviours, speculations, causes and treatments (Stake, quoted in Henning et al 2005:32).

The purpose of case study is to depict and conceptualise an educational phenomenon clearly through the vehicle of description; or to explain a particular educational phenomenon by observing emerging patterns; or to evaluate and make judgements about a certain educational phenomenon (Gall, Gall & Borg 2005:306). In case study, the researcher selects to gain an in-depth understanding of one specific phenomenon or a particular entity be it a student, a group, a classroom, a community, an administrator , a singular event, a process, a policy or a programme; and data analysis centres around this one specific phenomenon (Liamputtong 2009:200; Lichtman 2006:74; McMillan & Schumacher 2006:316; Punch 2009:119). Smith (quoted in Henning et al 2005:41) concurs by indicating that a distinguishing feature of case studies is that they are rigorous descriptions and analyses of a specific unit or bounded system. In order to present a full picture or capture the true essence of the phenomenon, many case studies make use of both qualitative and quantitative methods of data gathering. Notwithstanding this mixed-

methods approach, case studies may be considered as such if they are framed within a bounded system (Henning et al 2005:41).

In this research the phenomenon pays reference to the THRASS literacy programme as a bounded system, and other themes beyond this bounded system are not investigated. The goal of this research undertaking has been to gain a better understanding of this specific case and is, thus, considered an *intrinsic case study* (Punch 2009:119). The intrinsic case study is very popular in education and with programme evaluators whose aim it is to evaluate the effectiveness of a programme. The advantage of intrinsic case study is that the researcher can devote all of his or her time to the study of a single case in order to develop an in-depth understanding (Johnson & Christensen 2004:377).

Case study, per se, is appropriate for this type of exploratory and discovery-oriented research regarding the efficacy of the THRASS programme in supporting the literacy development of an Intermediate Phase learner who is deaf and who uses the spoken language approach, because there is a dearth of research relating to this topic under study and this research will hopefully lead to further inquiry. Indeed, both the programme and the research participant may be considered as unusual, unique or special, particularly in combination (Lichtman 2006:75). Additionally, the detailed description and analysis of this intervention programme has the ability to contribute to educational practice (McMillan & Schumacher 2006:317-318). However, the goal is not to make generalisations to other cases, but rather to obtain a detailed and thick description of the selected case in its own right (Lichtman 2006:75).

The researcher has sought systematic connections among observable behaviours of the research participant during the THRASS literacy programme intervention and has speculated about this behaviour in respect of possible causes of this behaviour and potential treatments, or how to best address this behaviour. Thus, the aim has not been to describe the case (the THRASS literacy programme), The aim has been to attempt to identify patterns and relationships as the research participant interacts with the case, in order to evaluate the efficacy of the programme. This is the dynamic that gives the inquiry merit because the researcher is of the opinion that there is ‘’something to be unravelled in the case’’. There is a need to *evaluate* the utility of an intervention programme albeit on a very small scale in relation to general evaluative research undertakings involving numerous stakeholders (Henning et al 2005:32).

Within the realm of education, evaluation research is conducted to explore educational programmes, and the evaluation researcher must consider both the research design and the method of data collection most suitable to answer the posed research question (Check & Schutt

2012:146). The distinction between general qualitative research and evaluative research is that the theory of evaluation and assessment come to the fore (Henning et al 2005:47). Although this study is not a large-scale, high-stakes test investigation funded by programme stakeholders, it does involve the evaluation of a programme nonetheless. The primary purpose of this will lead to a judgement on whether this programme is effective to its intended target and, as such, this impact study may be termed a 'summative evaluation' (Johnson & Christensen 2004:10). Any educational programme may have outcomes that may be viewed as either positive or negative; outcomes that are intended or unintended, but that nevertheless strengthen the feedback loop of inputs, outputs and outcomes through the credible analyses of programme operations and effects. The evaluation process in its entirety, together with the distinct feedback, may only be valued in relation to the interests and viewpoints of program stakeholders such as educators, parents or funders (Check & Schutt 2012:147). Since the intent of any qualitative evaluation study is to encapsulate transformation, the study must originate a baseline assessment followed by the monitoring of the intervention process and culminating in an impact study (Owen & Rogers, quoted in Henning et al 2005:47). The central tenet of evaluation research is to assess the efficacy or impact of a particular programme and not necessarily to advance the implications of an educational theory (Check & Schutt 2012:147). Even so, the outcomes of this research may be most valuable to other stakeholders who are involved in the education of learners who are deaf or hard of hearing (DHH); such as the Department of Education, audiologists, speech therapists, learner support specialists and educators in special or inclusive settings. Indeed this research may be beneficial to the developers of the THRASS programme, to the ABSA Talk Together Project which sponsors THRASS teaching and learning materials as part of their corporate social responsibility, and to academic institutions involved in teacher training and education.

However, a caveat is pertinent at this point. If the research participant herself was the central focus of this study, the research design may possibly be defined as 'single-subject design' because this design focuses on a single participant. This is very similar to evaluation research because single-subject design is also underpinned by ''establishing intervention goals, providing the intervention, and evaluating progress'' as a characteristic of ''evidence-based practice'' (Check & Schutt 2012:214). The lines between the different research design - types are not always sharp and the research participant may also be considered as a *case study.*

The title of this study is, 'Implementing the Teaching Handwriting, Reading and Spelling Skills programme with an Intermediate Phase deaf Gauteng learner using the spoken language approach'. The aim of this research has been to explore the implementation of the Teaching Handwriting, Reading and Spelling Skills (THRASS) literacy programme as a supportive and the

Cued Speech option. The central tenet has been to assess the efficacy or the impact of this programme as case study; to encapsulate and appraise the process of transformation; and to put credibility and value to the programme operations and effects by paying service to the outcomes, whether they are positive or negative, intended or unintended. As the title suggests, there is only one research participant in this study – an Intermediate Phase learner who is deaf and who uses the spoken language approach. In order for the reader to understand the reason for this selection, it is necessary to introduce the reader to both the research participant and the researcher in this study.

4.3.2 Selection of research participant

Sampling in qualitative research is dominated by 'purposive sampling' because samples are selected in a deliberate manner whilst keeping the purpose or focus of the study as pivotal to the sampling. As researchers, it is impossible to ''study everyone everywhere doing everything''. Sampling decisions must revolve around whom to interview, what to observe, in which settings and by which processes (Punch 2009:162).

The THRASS programme was selected for in-depth analysis of a phenomenon because the programme is unique in that it incorporates a Phoneme Machine together with a Cued Speech option for learners who are deaf. However, the research participant herself may also be viewed as a unique-case sample because she brought to this study a unique set of factors surrounding her loss of hearing and subsequent rehabilitation. In this respect, the mother of the research participant was engaged in the study via the process of in-depth interviewing because she is considered an 'information-rich' key informant (McMillan & Schumacher 2006:319-320).

Punch (2009:163-164) emphasises that no matter which qualitative sampling strategies are employed,

> there is a clear principle involved, which concerns the overall validity of the research design, and which stresses that the sample must fit in with the other components of the study…. The sampling plan and sampling parameters… should line up with the purposes and the research questions of the study.

The research site itself – a small, private supported mainstream school – was selected for convenience because the research participant attends the school, the researcher is an educator at the school and the school has been sponsored by the THRASS Absa Talk Together Project. This rendered the researcher the opportunity to conduct research. In order for the reader to gain a clear picture of the research participant and to relate this background information to the data processing and analysis, as well as the interpretation of findings, it is pertinent to equip the reader

with background knowledge of the research participant who, for the purposes of this study, will be referred to as *Sally* (pseudonym).

4.3.3 The research participant's background

Sally was born on Tuesday 9th December 1997 with apparently normal hearing. She was carried full term and underwent a normal birth, weighing in at 2,7kg. At the age of 8 months (August 1998) she was hospitalised with severe bronchitis and pneumonia resulting in her need to use an asthma pump for 7 months until her chest cleared up. According to her mother, Sally, who was now 15 months of age, had started speaking clearly and she could count and sing rhymes learnt at nursery school. One month later (24 April 1999), when Sally was aged 16 months, her older brother (aged 4 years) contracted both encephalitis and meningitis at the same time. This is called meningoencephalitis. However, after a few days in ICU he recovered well with no apparent side effects.

In September 1999, when Sally was I year 9 months (21 months) old, she became feverish and dehydrated. She was rushed to a hospital causality ward to be put on a drip. Her fever became progressively worse and Sally became delirious, but the ward staff did not call for a doctor. When the ward doctor did his rounds that evening he had Sally immediately transferred to the isolation ward. A few hours later the doctor announced that Sally had contracted a severe bout of pneumococcal meningitis.

> Pneumococcal meningitis is the most common form of meningitis and is the most serious form of bacterial meningitis. Some 6,000 cases of pneumococcal meningitis are reported in the United States each year. The disease is caused by the bacterium *Streptococcus pneumoniae,* which also causes pneumonia, blood poisoning (septicaemia), and ear and sinus infections. At particular risk are children under age 2 and adults with a weakened or depressed immune system. Persons who have had pneumococcal meningitis often suffer neurological damage ranging from deafness to severe brain damage (NINDS 2011: para. 4 under heading, What causes meningitis and encephalitis).

Sally was hospitalised for over a month and was discharged in early October 1999 at the age of 22 months. Sally's parents were concerned about Sally's hearing and mentioned this to the doctor during the check up a week after Sally's discharge from hospital. An appointment was set up at a hearing clinic and a number of tests were administered whilst Sally was awake and when she was asleep. Sally was subsequently diagnosed with a hearing loss of about 57-70dB (moderately severe) in the left ear and around 71-90dB (severe) in the right ear post pneumococcal meningitis. However, her hearing has deteriorated to the point of profound (>90dB) bilateral hearing loss. (See section 2.2.3).

In January 2000, when Sally was 2 years I month of age, she was tested to ascertain which hearing aids would be most suitable for her. The ABR (auditory brainstem response) test was administered to evaluate degree of hearing loss and facilitate hearing aid fitting; and the OAE (otoacoustic emission) test was administered to assess amplification function of the cochlea in the inner ear. The results indicated that Sally should be fitted with Digifocus hearing aids. As previously indicated in chapter two (see section 2.2.6.1), digital hearing aids are calibrated to amplify only the signal for those specific frequencies that correlate to an individual's hearing loss, resulting in less interference from background noise (Marschark 2009:42). Digital hearing aids also reduce loudness discomfort, acoustic feedback and increase the audibility of soft sounds (Harkins & Bakke 2003:413).

Sally was fitted with digital hearing aids, but after 6 weeks Sally's parents noticed little change except that Sally had started babbling a little and began to lip read – her parents communicated with her through spoken language without the use of manual sign. A further drop in hearing to profound hearing loss was confirmed by a hearing test in March 2000 and, although Sally was fitted with more powerful hearing aids, she did not respond well to these, had constant ear infections and lost the speech she had acquired prior to the attack of meningitis.

Sally began to attend speech therapy twice a week and started developing her ability to lip read. Sally also spent a short while at a school for the profoundly deaf, but her mother decided that she did not want her child to learn to sign only – she was confident that Sally could learn to talk again - and undertook to investigate the option of implanting cochlear units. Sally was screened for cochlear implant candidacy, but the professor indicated that implantation could not be left too long due to the evidence of calcification of the cochlea in both of Sally's ears.

On 18th March 2002, after extensive fundraising attempts by Sally's parents, Sally had a cochlear unit implanted into her right ear. She was 4 years and 3 months of age at this point. Sally was subsequently enrolled at the Centre for Language and Hearing Impaired Children in May 2002 at the age of 4 years and 5 months – she had no oral expressive language at this stage; neither was she using sign for communication. She relied extensively on speech reading and residual hearing for the purposes of communication.

Sally had her second cochlear unit implanted into her left ear on 29th March 2005 at the age of 7 years and 3 months. However, the surgeon only managed to insert a short electrode due to substantial calcification of the cochlea. Subsequent to the second implant, Sally's parents noticed much improvement in Sally's abilities to detect sound and to communicate via speech reading combined with residual hearing via the aid of bilateral cochlear units (oral receptive language)

and oral expressive or spoken language.

Sally had, up to this point in time, still been attending a Centre for Language and Hearing Impaired Children and she had been receiving regular speech therapy. However, due to her age, Sally's parents had to find a suitable school for her. Sally was enrolled at a special school where she remained until the end of 2008. At that stage Sally was evidently functioning academically at Grade Two level. At the beginning of 2009, Sally enrolled at a small private supported mainstream school where she, at first, followed an essentially individualised educational programme (IEP), but subsequently has followed the core mainstream curriculum with additional support – the auditory-oral or spoken language approach is the method of communication. During the time of the study Sally was in the Intermediate Phase of schooling, but she has now been bridged over into the Senior Phase. Sally has been attending the same school for the last 4 years and it is at this school where the researcher is an educator and this is the setting in which the research took place.

4.3.4 The researcher

The kinds of questions we ask and the manner in which we attempt to answer these questions in any research endeavour depends on the researcher, and any interpretations of the research are based on the researcher's experience and background (Lichtman 2006:9,38). The researcher has been an educator for over thirty years and has held a number of different positions in the field of education. However, the primary interest has always been that of offering additional support to learners according to their diverse needs. A number of years ago the researcher studied remedial education based on the medical model and has subsequently upgraded her qualifications to meet the needs of the more recent inclusive education.

The researcher is based at a small private, inclusive school in Johannesburg which caters specifically for learners from Grade One to Grade Twelve who require a supported mainstream environment. A multilevel, flexible teaching approach is used, and learners straddle the Grades and Phases where necessary as part of an adaptive programme. A number of learners work on Individual Education Programmes (IEP), alternatively referred to as Individual Learner Support Programmes (ILSP). These programmes are designed to scaffold each learner from his or her unique zone of proximal development because the curriculum is tailored to each learner's needs rather than expecting each learner to fit in to the curriculum. The researcher is responsible for the development of these programmes and also for the support of each learner on a pull-out basis when necessary. However, additional learner support is also offered in each classroom in the form of interactive, collaborative co-teaching on a rotational basis. This means that the researcher

as learner support specialist, and the general class teacher, are both engaged in the teaching and learning event during which direct additional support is offered on an individual needs basis. Collaborative co-teaching facilitates an increased intensity of individualised instruction and support.

The researcher, who has attended the Teaching Handwriting, Reading and Spelling Skills accredited course as well as the refresher course, spent part of a morning at a School for the Deaf to observe teachers administering THRASS keyword spelling tests in both the Foundation Phase classroom and the Intermediate Phase classroom. By way of demonstration the tests were initially administered vocally without the addition of Cued Speech and, subsequently, with Cued Speech in synchronicity with the keywords. The results obtained in the pre-tests and the post-tests in both phases illustrated the pivotal role played by adding the visual clues to speech reading to support the disambiguation of phonemes and syllable structures and provide visual access to an auditory-based phonological code. The school in question is in a rural area where the majority of deaf children have been born to hearing parents, many of whom are illiterate themselves. These children had little experience of natural sign language at an early age; neither did they all have access to modern technology in the form of cochlear implants, digital hearing aids, FM systems or suitable classroom acoustics. During this time, the researcher also attended a Cued Speech Foundation Course run by Cued Speech South Africa (CSSA) because the Phoneme Machine, together with the Cued Speech option, plays a pivotal role in this research undertaking.

The THRASS '15 Minutes A Day 'class lessons were organised using a collaborative co-teaching strategy because the researcher had attended the Cued Speech Foundation Course at Cued Speech South Africa. During the lessons the researcher provided Sally, the research participant, the alternative strategy of teaching her Cued Speech and the IPA symbols to support her in the disambiguation of the phonemes being taught in each lesson, and to offer her face-to-face re-instructional support so that she could make full use of her speech reading abilities and her residual hearing. It must be reiterated that only 20-30% of words are discernible on the lips, even in dyadic conversations. However, it was impossible to cue during the singing of the THRASS songs or during the Raps and Sequence practice because the Raps and Sequence CD and many of the SING-A-LONG songs are at too rapid a pace. As has been previously stated, the utility of Cued Speech together with the Phoneme Machine as a visual tool to support the development of phonemic awareness is central to this study.

During the one-on-one THRASS additional support sessions with the research participant the researcher took on the primary role as teacher whilst the general class teacher took on the role

as information gatherer to observe and record specific behaviours and responses – this is another form of co-teaching strategy where one person teaches and the other person gathers specific observational data on a learner. The raison d'etre for the researcher taking on the primary role of educator in these sessions was because the researcher could utilise the Cued Speech option and the International Phonetic Alphabet (IPA) symbols in the THRASS Phoneme Machine to support the research participant as she interacted with the programme, and read additional resource materials. It must be noted that in the school setting school commitments did not always allow both educators to be present at every single group or individual THRASS lesson. However, the lessons were recorded for the purposes of information gathering and discussion of findings.

Participant observation is undergirded by a blend of specific data collection strategies such as limited participation in the setting, field observations, interviewing and artefact collection. Participant observation is suited to the research approach of case study whereby the researcher creates a role for the purpose of the study. However, the researcher already has a position at the school where the study has taken place and did more than just participate unobtrusively in a limited manner because the researcher was involved in collaborative co-teaching. The researcher was very self-aware and conscious of this situation and continually strove to ensure validity, credibility and confirmability during the study (McMillan & Schumacher 2006:345). Within the context of ethics in education, Punch (2009:40) examines the contemporary role of 'practitioner-researcher' or 'teacher-researcher' by explaining that involvement in research concerning the researcher's own practice is an integral part of on-going learning to develop more practitioner expertise and inform and improve practice – there is a world-wide trend across many professions towards 'evidence-based practice'.

As 'teacher-researcher' within a collaborative co-teaching framework the researcher has taken into account both the advantages and disadvantages of this approach. The collection of data has been convenient because the study took place in the same setting in which the researcher is an educator and the research participant a learner. This also made access easier, but not without the knowledge and consent of the people involved. The research project was professionally relevant as the THRASS programme was being introduced as part of a whole-school approach. The researcher has insider knowledge and understanding of the research situation and this aided the enrichment and depth of the study in terms of interpretation and consideration of transferability to other situations. However, the researcher had to continually be aware of her 'positionality' with regard to subjectivity and bias, particularly in respect of data interpretation which takes place through the 'lens' of the researcher – member checking played a pivotal role here. The researcher also noted that special ethical issues were involved because of the dual role

of researcher and co-teacher. Confidentiality, protection and the use of data collected for the research study were carefully considered (Punch 2009:44-45).

The term *data* denotes the materials, evidence or clues that researchers source from the setting where the research takes place, and data is collected for the purposes of analysis. Qualitative data is generally collected by means of interviews, participant observation, field-notes and artefacts such as documents; and this bears reference to the research *method* employed to gather, organise and analyse the data (Bogdan & Biklen 2007:117; Punch 2009:144). Interviews, participant observation and field notes, and artefacts were used as data collection strategies in this study.

4.4 RESEARCH METHODOLOGY

4.4.1 Data collection strategies

> Qualitative methods [are] designed to capture educational reality as participants experience it rather than in categories predetermined by the researcher. These methods typically involve exploratory research questions, inductive reasoning, an orientation to the social context of educational activities, and a focus on human subjectivity and the meanings attached by participants to events and to their lives (Check & Schutt 2012:189).

Since research methodology is systematic and serves a particular purpose, procedures are not haphazard, but are planned in order to yield data in respect of the specific research problem (McMillan & Schumacher 206:9). Multiple methods were used in this study to accumulate data in a planned and sequential manner to yield data concerning the same phenomenon and enhance the credibility of this study via the process of triangulation. Triangulation refers to the procedure of using multiple data-collection strategies (Punch 2009:313). Triangulation occurs when there is cross-validation among various data sources, data collection strategies, time frames and theoretical schemes. The researcher examines the various sources, methods and situations to identify recurrent patterns (McMillan & Schumacher 2006:374) and in this way the data collected is verified by employing different methods.

4.4.1.1 *Interviews*

Within the qualitative framework, interviews may be the dominant form of data collection, or they may be utilised in conjunction with participant observation, document analysis, or other strategies

(Bogdan & Biklen 2007:103). However, generally speaking, the interview tends to feature prominently in data collection because it is most suitable as a vehicle for accessing each person's perceptions, beliefs, explanations of situations and constructions of reality (Punch 2009:144). According to Warren (quoted in Henning et al 2005:70) interview-based research comprises three phases. Firstly, the researcher must find the respondents and organise interviews to suit the overall research design. Secondly, the interviews must be conducted and recorded. Finally, the researcher is obliged to reflect on the interviews to analyse and interpret the raw data.

Interviews may take on a variety of forms and may be employed to achieve a multiplicity of purposes. Individual, face-to-face dyadic conversation is most commonly used, but interviews may also take the form of face-to-face group interviews, self-administered or mailed questionnaires, or telephonic surveys. Interviews can be structured, semi-structured or unstructured; they may involve one brief exchange or a series of lengthy engagements and they may be utilised for a myriad of purposes (Fontana & Frey, quoted in Punch 2009:144-145). Many people view in-depth interviews as ''the flagship of the qualitative interview genres" (Henning et al 2005:74). However, no matter which types of interviews are used in any study, the aim is to gather information from the research participant in respect of the topic the researcher has undertaken to study (Lichtman 2006:117).

In this study interviews were used in conjunction with other data collection strategies such as participant observation, field notes and document analysis. Individual, in-depth, unstructured, recorded interviews were carried out with the mother of the research participant in order to gain an historical profile of the research participant's life journey from birth to the current time. The mother of the learner was considered as an information-rich participant in the study because of her intimate knowledge of her child, because of the challenges she has had to face and the effort she has put in regarding the education of her deaf child. The mother may be considered a key informant because key informant interviews are undertaken with a person who has special knowledge that she is willing to share in confidence with the researcher (McMillan & Schumacher 2006:350). Interviews were conducted before the commencement of the study, at intervals throughout the study, and at the culmination of the study. As the research participant is a learner at the school where the researcher is employed, the mother was well-known to the researcher and a rapport existed between them; an ambience of trust had already been established. According to Lichtman (2006:119), the central tenet of this type of interview is ''to hear what the participant has to say in her own words, in her voice, with her language and narrative….[and] individual, in-depth interviewing is more a process, not just a predetermined list of questions''. McMillan and Schumacher (2006:350-351) affirm that in-depth interviews involve open-response questions to illicit data concerning how a person perceives her world and makes sense of

significant events in her life. Interviews were recorded using a digital Dictaphone; the audio files were then transferred to a computer and transformed into typed transcripts (Bogdan & Biklen 2007:129,131).

The interview guide approach was the type chosen for interviewing the research participant's general class teacher before the commencement of the THRASS intervention because the researcher wanted to explore specific topics, and put forward certain open-ended questions to the interviewee. The interview protocol was pre-planned, but the researcher did rephrase some questions, omit some questions and add in other questions because this interview technique is also relatively unstructured, situational and conversational (Johnson & Christensen 2004:183; McMillan & Schumacher 2006:351).

During participant observation, a data collection strategy which featured most prominently in this study, field records were gathered for the purposes of processing and analysis. Permission was granted for the researcher to make use of a digital recording device and a digital camera for these observations which were supplemented with written fieldnotes.

4.4.1.2 *Participant observation and field records*

> Participant observation is the seminal qualitative research method – a means for seeing the world as the research subjects see it, in its totality, and for understanding subjects' interpretations of that world (Wolcott, quoted in Check & Schutt 2012:192).

Participant observation is underpinned by a combination of data gathering strategies such as limited participation, field observation, and interviewing, as well as artefact collection in natural as opposed to contrived settings. Participant observation may be used as a vehicle for obtaining people's perceptions of events and processes conveyed as feelings, thoughts and beliefs. These perceived experiences may be in the form of verbal, non-verbal or tacit knowledge (McMillan & Schumacher 2006:346). Johnson & Christensen (2004:186) confirm that observations may be defined as the noting of behavioural patterns of individuals in particular situations with the aim of procuring information regarding the phenomenon of interest.

As has been previously mentioned, the researcher took on the role of *overt* or true participant observer which means that the researcher did not have to hide her identity as a researcher, nor was she a non-participant by virtue of the fact that the researcher has always been involved in collaborative co-teaching at the research site. Hence, the problem of reactive effects whereby research participants may alter their behaviour did not come to the fore (Check & Schutt 2012:193-194).

Participant observation and the collection of field notes predominated in this study. Advance planning for the participant observation sessions took the form of prepared lesson plans and strategies for collaborative co-teaching, and the closure of these sessions involved listening to and observing recordings and discussing observations and field notes to record in written form. An information-rich observation journal was kept for record purposes and member cross-checking.

The criterion-referenced and norm-referenced baseline and summative assessment sessions, which involved reading aloud skills and spelling skills, were recorded on a digital Dictaphone and then transferred to a computer. This allowed the researcher and the general class educator, who were both involved in the testing, to replay the research participant's verbal responses where necessary in order to evaluate her responses and her articulation of phonemes and words.

4.4.1.3 *Artefacts*

Artefact collections, which are tangible indications for describing people's experience, knowledge, actions and values, may take the form of personal documents, official documents, and objects – these documents may be referred to as secondary or existing data. Personal documents include personal letters, diaries, autobiographies and anecdotal records. Official documents comprise of memos, minutes of meetings, or students' files which contain tests, school achievement reports, comments from teachers, medical and paramedical reports. Learner profiles are generally elaborate and important because these files follow the learner throughout his or her schooling career (Bogdan & Biklen 2007:133-138; McMillan & Schumacher 2006:356). Objects consist of created symbols and tangible entities such as logos, mascots and trophies (McMillan & Schumacher 2006:358).

McMillan and Schumacher (2006:357) remark that researchers access a student's personal file for the purpose of evaluating the different perspectives that various stakeholders such as educators, counsellors, administrators and psychologists hold regarding the student. The researcher accessed the research participant's learner profile in order to find out the history of the research participant's school career to date; to consider the anecdotal comments of educators, and to view medical and paramedical reports such as psychological reports, neurological reports, reports from speech therapists and audiologists, as well as audiogram results over a time frame.

The raw data obtained from the interviews, the observations and field notes as well as the artefacts in this study were collated by the process of induction and interpretation to create 'the big picture' because, in qualitative analysis, the whole is always greater than the sum of its parts.

The researcher identifies important categories in the data, and looks for emerging patterns and relationships for the purposes of analysis (Check & Schutt 2012:300).

4.5 DATA PROCESSING AND ANALYSIS

''The human factor is the great strength and the fundamental weakness of qualitative inquiry and analysis – a scientific two-edged sword'' (Patton 2002:433). Qualitative analysis transforms raw data into research findings, but there is no formula or recipe for this transformation. Each qualitative study is unique in its own right and, therefore, calls for a unique analytical approach. Qualitative inquiry is dependent on the skills, training, insights, and capabilities of the researcher throughout the stages of inquiry, and the qualitative analysis resulting from the inquiry will ultimately depend on the analytical intellect and style of the analyst (Patton 2002:432-433). McMillan and Schumacher (2006:366) concur by stating that analysing qualitative data is an eclectic activity free of strict rules, but requiring a sound level of methodological knowledge and intellectual competence from the researcher.

The researcher was well aware that she was the instrument of data collection, processing and analysis. This necessitated the need to continually take stock of her behaviour, her assumptions, and her impact in the research setting. Being central to the collection and analysis of data, the researcher kept an accurate record of methods and procedures used to procure data and continually reflected back on her field notes (Bogdan & Biklen 2006:122).

Reflexive analysis bears reference to the process whereby qualitative researchers rely predominantly on their intuition and personal judgement in order to analyse the raw data that have been gathered – there is no prescribed set of procedures or explicit system for this undertaking. The researcher must reflect back on both the surface features as well as the very essence of the phenomenon under study. Some case studies that involve educational evaluations follow a process of critical judgement and appreciation of merits whereby educational stakeholders may understand the features and purposes of educational programmes and appreciate their strengths and weakness (Punch 2009:317-318). The researcher's evaluation of the efficacy of a case, which is the THRASS programme, has been the principal aim of this study. During analysis, interpretation and discussion of findings the researcher examines and reports on the case because the case is the predominant unit of analysis in case study research. Other units of analysis that are embedded in the research may also be examined. Within the school setting an embedded unit of analysis could be classrooms, teachers, students (Johnson & Christensen 2004:379). In this study the embedded unit of analysis has been Sally (pseudonym), the research participant.

The launch and the landing of this research study involved the administering of both criterion-referenced and norm-referenced tests. As the results of these pre-tests and post-tests were essentially numerically-based, this data required a quantitative analysis. However, the test situations also gave birth to valuable insight which was drawn from observations of the research participant during the testing procedures, and this required a qualitative analysis. The mainframe of this study involved qualitative procedural analysis during which the researcher maintained an intellectual rigor and tolerance for tentativeness of interpretation until the entire analysis was completed (McMillan & Schumacher 2006:364).

Case study research methodologists are inclined to be pragmatic and advocate the eclectic approach of using multiple methods as well as multiple data sources for the purposes of triangulation (Johnson & Christensen 2004:379). The researcher recorded and analysed the multiple data sources during and after every encounter with participants in the field so that the data analysis was rigorous and not divorced from the data collection process. This cyclical or recursive process of data collection and analysis is called *interim analysis* (Johnson & Christensen 2004:500). Not only did this method support triangulation, but it also empowered the researcher to plan for future interviews, to observe any emerging patterns and to adjust the face-to-face individual lessons with the research participant in response to how the research participant was interacting with THRASS programme in its entirety. The patterns that emerged from the data relating to the implementation of the THRASS programme - and in particular the utility of the Phoneme Machine with the Cued Speech option - served as the thematic framework for reporting the findings and organising the research report (McMillan & Schumacher 2006:373). Additionally, the data collection strategies and the analysis of multiple data sources helped to increase the validity or trustworthiness of the case (Johnson & Christensen 2004:379).

4.6 VALIDITY AND RELIABILITY

Validity refers to the extent ‘’…to which the interpretations have mutual meanings between the participants and the researcher…and [these] claims of validity rest on data collection and analysis techniques” (McMillan & Schumacher 2006: 324). Qualitative research involves the utility of multiple strategies to ensure design validity and the issues of feasibility and ethics are enmeshed in the choice of strategies; the latter being appropriate to maintain the least amount of intrusion whilst intensifying the quality of the data (McMillan & Schumacher 2006: 324). Generally speaking, qualitative researchers contend that some qualitative research endeavours are superior to others, and they often use the term *validity* to refer to this difference. The term *validity* in qualitative research denotes research that is ‘’plausible, credible, trustworthy, and therefore defensible’’ (Johnson & Christensen 2004:249).

The researcher used the following strategies to enhance design validity and ensure reliability of the study:

- Prolonged and persistent fieldwork – to provide for discovery, evaluation and validation in respect of the case study and the interaction of the research participant with the case - being the THRASS literacy programme in its totality - the fieldwork extended over a full school year. This lengthy data collection provided the opportunity for interim data analysis to inform further investigations and re-align the way forward.
- Multi-method strategies – the researcher employed several data collection techniques, but the fundamental method was observation of the research participant interacting with the case. The use of multiple methods of data collection allowed for methods triangulation. Triangulation was achieved, for example, when evidence of speech sound production errors came to the fore in artefacts (learner profile), informant interviews (mother of research participant) and during field observations.
- Participant language and verbatim accounts – all interviews were recorded and transcribed word-for-word and all research participant responses were recorded mechanically and then transferred to fieldnotes in the form of a researchers journal.
- Low-inference descriptors – the researcher recorded precise and detailed descriptions of how the research participant interacted with the THRASS programme, as this was central to the study and essential for recognising emerging patterns in the data.
- Mechanically recorded data – a digital Dictaphone was used to record all interviews and observation in the field. These recordings were transferred to computer to provide accurate and complete records and to allow for reflecting back on data collected for analysis. Lessons were also recorded in camera.
- Member checking – participants in the study were asked to verify the accuracy of data collected during observations and interviews as it happened in the field. Participants were requested to corroborate synthesized data for authenticity. The researcher kept fieldnotes in the form of a journal for the purposes of reflexivity and to enhance confirmability. The journal was used by the auditor to track the progress of the researcher (Johnson & Christensen 2004:250; McMillan & Schumacher 2006:324-326).
- The researcher was continually aware of researcher bias which may result from selective observation and selective recording of information and was, therefore actively engaged in self-reflection and self-scrutiny throughout the entire research endeavour. Rigorous reflexivity is paramount for attaining credibility in any study and this is directly linked to research ethics (Johnson & Christensen 2004:249; McMillan & Schumacher 2006:327).
- In order to avoid researcher bias or subjectivity, the researcher continued to strive for objectivity during data collection and analysis procedures by taking into account the methods that may be used to control for bias, or take into account subjectivity (McMillan

& Schumacher 2006:9). This was achieved by using a collaborative, co-teaching strategy when interacting with the research participant and discussing and reflecting back on observational field notes as a team.

4.7 ETHICAL CONSIDERATIONS

Since qualitative research may be generally thought of as being more intrusive than quantitative research, the qualitative data analyst is never far from ethical issues and dilemmas, and the researcher must deliberate on how the findings may be utilised and how the research participants may react (Check & Schutt 2012:320; McMillan & Schumacher 2006:333). Ethical guidelines include obtaining informed consent, privacy, confidentiality, anonymity, deception, and caring (McMillan & Schumacher 2006:333).

The researcher adhered to ethical guidelines during the research process by means of the following procedures:

- Gaining informed written consent from all members, pledging anonymity and confidentiality and explaining what the data is intended for. (See Appendices A-E).
- Discussing the voluntary participation with each participant and the freedom to withdraw from the study at any stage if so preferred.
- Ensuring that the settings and the participants cannot be identified in any way by using pseudonyms in the discussion and writing up of the research as a strategy to protect the identity of the participants and protect them from the general reading public.
- Ensuring that access to data is restricted.
- Giving feedback to all participants in the study.
- Obtaining permission to record interviews and observation sessions.
- Allowing members to check transcriptions of interviews for verification.
- Providing a safe and nurturing environment and establishing a relationship built on mutual respect and trust with all participants by being caring, showing fairness and making use of open discussion (McMillan & Schumacher 2006: 334-335).

4.8 SUMMARY OF CHAPTER FOUR

This chapter has served to orientate the reader to the research design and methodological context of this study. The research was categorised as falling predominantly within the qualitative paradigm which embraces interpretivist philosophy; although there are parts of the study deemed as quantitative, and this falls within a mixed-methods, evaluative approach.
The research design of case study, with the THRASS intervention programme as the case under

investigation, was introduced and linked to the aim and the title of the research study. The selection of the Intermediate Phase deaf learner as research participant was discussed and the reader was given insight into this learner's historical profile. This section culminated with an introduction to the researcher who undertook the study.

A discourse of the research methodology ensued and the data gathering tools that best suited this research undertaking were expounded. The reader was subsequently provided with an explanation of the data collection, processing and analysis strategies utilised in this research endeavour.

This chapter concluded by conveying the strategies employed by the researcher to augment design validity and ensure reliability of the study. This was linked to ethical considerations, and the researcher put forward the ethical guidelines which were followed in this study. The succeeding chapter builds on this chapter in terms of writing a report based on the analysis and interpretation of the findings emerging from the data.

CHAPTER FIVE

ANALYSIS, INTERPRETATION AND DISCUSSION OF FINDINGS

5.1 INTRODUCTION

> Qualitative researchers tend to analyse their data inductively. They do not search out data or evidence to prove or disprove hypotheses…. Theory… emerges from the bottom up…from many disparate pieces of evidence that are interconnected. The theory is grounded in the data…. You are constructing a picture that takes shape as you collect and examine the parts (Bogdan & Biklen 2007:6).

The aim of this chapter is to analyse and interpret the findings from the data gathered during the research undertaking, and present these to the reader in the form of observations and discussions. Reference will be given to chapter two which reviewed the concept of deafness and education for the deaf, as this pertains to the data analysis, observations and interpretation of findings. Additionally, the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme as discussed in chapter three, will form a central part of this discussion because the way in which the research participant interacted with the programme – being the *case* in this study – is the central tenet of this investigation. The aim of this research undertaking has been to investigate the extent to which the THRASS programme – which incorporates the use of a Phoneme Machine together with a Cued Speech option – may enhance the literacy levels of an Intermediate Phase learner who is deaf and who uses the spoken language approach.

Evaluating the efficacy of the THRASS programme has necessitated adopting a mixed-method research design. Quantitative research design in the form of scored criterion-referenced and norm-referenced pre-tests and post-test were used at the Phase One launch and the Phase Three landing of this research undertaking, and the qualitative research paradigm was employed during the Phase Two intervention process.

Criterion-referenced tests determine the level at which a learner has achieved specific skills or concepts before and after an intervention takes place, whereas norm-referenced tests rank a learner in terms of achievement in comparison to the highest and lowest levels of achievement of a broader population and these raw scores are converted and expressed as scaled scores or percentiles.

In Phase One of the research study, quantitative data analysis and interpretation commenced from the bottom-up using the results obtained from the criterion-referenced and norm-referenced

baseline assessments or pre-tests, which were administered to the research participant *before* embarking on the THRASS intervention programme, as points of departure. Qualitative data collection continued during the intervention phase (Phase Two of the study) when the participant was introduced to and interacted with the THRASS programme over a school year. Quantitative data collection culminated Phase Three of the study with the re-administration of the same tests to evaluate the results of the intervention.

The research participant's oral responses were recorded on a digital recording device or camera and transferred to a computer. Both the class teacher of the research participant and the researcher were present during the testing procedures as well as during most of the intervention process which involved both group and individual teaching sessions so that field observations and notes taken could be discussed and checked against the recordings. Thus the research consisted of three distinct phases.

5.2 RESEARCH PHASES

5.2.1 Phase One data analysis of findings

The first phase was embedded in the quantitative paradigm with the administration of a battery of pre-tests in order to establish a baseline assessment of literacy performance. The criterion-referenced tests were employed to gauge Sally's mastery of the skills and concepts pertaining to literacy development, and the norm-referenced tests were utilised to evaluate the same skills in terms of grade or age level scores. The below-mentioned tests were administered *before* the research participant, Sally, was introduced to the THRASS intervention programme. However, it must be pointed out that the norm-referenced tests are benchmarked from the *hearing* population. Additionally, the Schonell reading and spelling tests as well as the Burt reading tests are somewhat outdated, but they are the only standardised tests available and they are still used extensively in South Africa. (See section 5.2.2.1 to 5.2.2.7).

The ensuing criterion-referenced and norm-referenced tests were administered with the research participant in phase one of the intervention programme in the form of pre-tests; the purpose of which was to yield a baseline assessment in terms of the mastery of skills and concepts as well as grade or age level literacy performance. Data obtained during the testing procedure were analysed in terms of speech sound production (See section 2.6.4 for a discussion on speech sound production); reading and spelling. (See section 2.6.6 for a discussion on reading acquisition).

5.2.1.1 *The THRASS 120 Reading Test*

This is a criterion-referenced test which is comprised of the 120 keywords representing the 24 consonant phonemes and 20 vowel phonemes on the THRASS Picturechart. The reader is asked to read aloud each row of words in a left-to-right fashion. The test is discontinued after ten consecutive errors are made. Words should be read as sight vocabulary and not be blended from separate sounds. Credit is only given to words pronounced accurately. (Discretion had to be used in this regard because of speech sound production in learners who are deaf). [1]

Sally scored 112/120 which translated to 93,3%. Reading errors include the following:

- short vowel substitution – bull for ball; dock for duck
- consonant substitution – pleasure for measure; threw for screw
- refusals – circus
- misreads – bolt for bird; powny for pony; dolpin for dolphin

The following speech sound production errors were noted. However, these errors did not affect overall scoring, although it is sometimes difficult to discern between 'misreading' and 'mispronunciation':

- short vowel monophthongs – ent for ant
- consonant plosives (k/g, p/b, t/d) – pook for book; pus for bus; tress for dress; tuck for duck; clue for glue; tiker for tiger
- consonant plosives for consonant fricatives (d/th) – fedduh for feather; tumb for thumb
- consonant fricatives (s/z) – fiss for fizz; sip for zip
- nasals for liquids (n/l) – naddah for ladder; namb for lamb

5.2.1.2 *The THRASS 120 Spelling Test*

This criterion-referenced test evaluates the ability to correctly spell the 120 keywords incorporating the 24 consonant phonemes and 20 vowel phonemes on the THRASS Picturechart. Each keyword is said aloud, repeated, and then used in a sentence to illustrate the word's meaning. The speller records the words in the grids from left-to-right and testing is discontinued after ten consecutive errors are made by the testee.

[1] Due to copyright restrictions THRASS tests, publications or illustrations may not be included

Sally achieved a raw score of 99/120 which converted to 82,5%. Spelling errors, which may overlap into different error categories, included the following:

- transpositions – beard for bread; gule for glue; slevae for sleeve; sqaure for square; gaint for giant
- reversals – panba for panda
- insertions – staition for station
- omissions – srew for screw; cirus for circus; quit for quilt; diner for dinner (k/s/l/n)
- substitution – pong for pony; moon for moor
- long vowel monophthongs [i:] – chesse for cheese; slevae for sleeve; sneazz for sneeze; pong for pony
- vowel digraphs – train for tray; staition for station; sqaure for square; thersure for treasure
- vowel diphthongs – gaint for giant
- affricatives [dʒ] – bighten for bridge
- unstressed syllable (schwa) [ə] – coller for collar

5.2.1.3 *The THRASS 500 Reading Test*

This test incorporates sight words or high frequency words and words with non-phonographic spellings as well as the 120 keywords. It is a criterion-referenced test of 500 base words where the reader is required to read the words in each row from left to right. Credit is only given to words read aloud as 'sight vocabulary' and not by word analysis and synthesis. Mark as correct any incorrect word pronunciations that may be attributed to mispronunciation due to accent or disability. The test is discontinued after ten consecutive errors are noted.

A raw score of 457/500 was obtained which was reduced to a percentage score of 91,4%. Analysis of reading errors which may fall into more than one category revealed the following:

- misreads – off for of (f/v could be an error of articulation); may for by; may for buy; am for I'm; no for now; cone for coin; far for fair; now for know; tower for tour; peas for piece (could be articulation); were for we're; belong for below; head for hedge; walken for woken; caught for called (could be articulation); ready for really; mishee for machine; truf for through; forty for fourteen (sound too similar to discriminate); difficult for different;
- insertions – cart for car; year for ear; hand for had; acrosst for across; sisters for sister
- substitutions – (vowels) run for ran; mom for mum; met for meet; den for than; beed for bed; putt for put; push for push (ʌ for ʊ); Semtember for September
- reversals – dall for ball

- omissions – fer for fern; ony for only; nail for snail; bride for bridge; open for opened; turn for turned; walk for walked; other for another; animal for animals; bought for brought; stop for stopped
- transpositions – waps for wasp; aksed for asked; begin for being
- refusals - plough

The below-mentioned speech sound production errors came to the fore, but discretionary practice was used to evaluate whether these were articulation errors or actual misreads:

- short vowel monophthongs – en for an
- consonant plosives (k/g, p/b, t/d) - ek for egg; klue for glue; tiker for tiger; Aukust for August; pook for book; pull for bull; poth for both; palloon for balloon; pecause for because; olt for old; coult for could; tisember for December; shoot for should; het for head; woot for wood/would; secon for second
- consonant fricatives (h, f/v, s/z) - is for his; ear for hear and here; Nofember for November; fiss for fizz; sero for zero; laser for laser; sebra for zebra
- nasals for liquids (n/l) - neg for leg; nady for lady; namb for lamb; neft for left; nots for lots; neave for leave; nadder for ladder; netter for letter; eneven for eleven; nittle for little; sneeve for sleeve
- consonant plosives for consonant fricatives (d/th, t/th, s/th) - de for the; dere for there/their; dese for these; dose for those; dat for that; dem for them; dey for they; dis for this; brudder for brother; birday for birthday; tink for think; wit for with; close for clothes
- consonant affricatives (ch [tʃ] for j [dʒ] - chanch for change; orich for orange
- liquids or laterals (r) - dury for during; Febirry for February

The ‘n’ sound in words such as near, next nine, nose and note sounded very ‘nasal’. The word ‘only’ which was misread as ‘ony’ could possibly be an error of articulation because of Sally’s seeming inability to articulate the liquid/lingual sound ‘l’. The misread ‘caught’ for ‘called’ could be because of articulation errors with the lingua-alveolar stops or plosives.

5.2.1.4 *The THRASS 500 Spelling Test*

This is a criterion-referenced test which evaluates the ability to spell the 500 sight words or high frequency words and words with non-phonographic spellings as well as the 120 keywords. Each word is said aloud, and then used in a sentence, and then the word is repeated. The speller records the words from left to right in the rows of grids. The test is discontinued after ten consecutive errors are noted.

Sally obtained a raw score of 435/500 which translated to 87%. Spelling errors which may overlap into different error categories included the following:

- insertions – rand for ran; rent for red; younger for young; trieds for tries; mamchine for machine; Sepetember for September; Wedenesday for Wednesday
- omissions – peas for please; was for wasp; stoped for stopped; close for closed; of for off; Febuary for February; Thurday for Thursday
- long vowel monophthongs [i:] - chesse for cheese; sleve for sleeve; sixty for sixteen; [u:] ballon for balloon
- transpositions [ʒ] - thersure for treasure; meaurce for measure; suddleny for suddenly; zerba for zebra; olw for owl [aʊ]; friut for fruit [u:]; sceret for secret;
- affricatives [dʒ] – hatch for hedge; biath for bridge
- unstressed syllable (schwa) [ə] - coller for collar; month for mother; moter for motor
- substitutions - swrew for screw; tried for tries; soup for soap; ouch for out
- fricatives (f/v,s/z) - fis for fizz
- plosives (t/d) - lift for lived
- diphthongs [aʊ] - plawn for plough
- reversals - panpa for panda

Errors possibly related to inability to discriminate sounds through speech reading and residual hearing alone without the use of Cued Speech to disambiguate phonemes include the following: ouch/out; mom/mum; fis/fizz; touch/such; friend/field; hatch/hedge; lift/lived; tried/tries; straight/ street; bought/brought; sixty/sixteen.

5.2.1.5 *The Schonell Graded Reading Test (1971)*

This is a norm-referenced test which ranks a learner in terms of reading skills achievement in comparison to the highest and lowest levels of achievement of a broader *hearing* population. The raw scores are converted and expressed as scaled scores or percentiles in the form of reading ages which can be compared to the reader's chronological age at the time of testing. Although the test is old, it is still frequently used in South Africa as very few graded reading tests are available. Credit is given for all words read correctly and testing discontinues when ten consecutive are read incorrectly. The total number of words read reflects the raw score and this is translated to a scaled score to reveal a reading age.

The raw score achieved by Sally was 39 words and this was reduced to a scaled score of 8 years and 8 months which was approximately 4 years and 5 months below her chronological age at the time. The following types of reading errors were recorded:

- misreads - sherbet for shepherd; currajee for gradually; up-lid for applaud; tor for choir; conoknee for colonel; sek for siege; plofit for pivot (consonant fricatives); i-lid for island; tuation for situated; attric for heroic
- omissions - carry for canary; solder for smoulder; norish for nourished; disease for diseased; pro-cy for prophecy; solist for soloist; sovely for slovenly; classfication for classification; ochestra for orchestra (pronounced as ch [ʧ] instead of k)
- insertions - crowned for crowd
- substitutions - tispossal for disposal(t/d plosives); physio for physics
- refusals – gnome
- syllabification - numerous errors noted in analysis (segmenting) and synthesis (blending).

Speech sound production errors included the following:

- nasals for liquids - night for light. The error i-lid for island could be an error of articulation
- consonant plosives for consonant fricatives (t/th) - tink for think; someting for something; tirsty for thirsty
- consonant plosives (p/b) - The error sherbet for shepherd could possibly be an error of articulation as well

5.2.1.6 *The Burt Graded Reading Test A (Revised Norms 1974)*

This norm-referenced test is based on the same principles as the previous graded reading test and the same test procedure applies.

The test yielded a raw score of 43 which was reduced to a scaled score of 7 years and 8 months. This reflected a reading age deficit of 5 years 5 months based on Sally's chronological age at the time of testing. Analysis of reading errors which may fall into more than one category revealed the following:

- misreads - bewar for beware; binosofear for philosopher; unfirshil for universal; effort for events; chunee for journey; eminee for emergency; circutus for curcumstances; finich for village (f/v); tractor for terror; dunk for tongue; deadness for steadiness; dis-tiny for destiny; exhansit for exhausted; tridning for trudging; u-met for ultimate
- omissions - explore for explorer; project for projecting; domine for domineer; labour for labourers; twist for twisted; motion for motionless; humanty for humanity; meldrama for melodrama
- substitutions - fridge for fringe; forminate for formulate; hemisphere for atmosphere; pinucular for binocular (p/b); scaring for scarcely; commentis for commenced; motionness for motionless

- transpositions - norshrishment for nourishment; apperhand for apprehend
- syllabification - numerous errors in analysis (segmenting) and synthesis (blending) noted again

Errors of speech sound production were reflected in the following words:

- consonant plosives for consonant fricatives (d/th, t/th) dat for that; tings for things
- consonant fricatives (h) – his for is
- nasals for liquids (n/l) – motionness for motionless
- consonant plosives (p/b) – pinucular for binocular could be a pronunciation error rather than a substitution
- affricatives([tʃ] for [dʒ]) - chunee for journey could be a pronunciation error rather than a reading error

5.2.1.7 *The Schonell Spelling Test B*

This test is also dated, but it is still commonly used in South Africa. A Schonell Spelling Test A is also available and may be used either as a control test or as an alternative test to review spelling competency after 6 months of intervention. The test procedure involves calling out each word, and then using the word in a sentence to illustrate the meaning thereof, followed by a repetition of the word for the purpose of clarity. The test is discontinued after ten consecutive errors are made. The raw score, which is the total number of words spelt correctly, is divided by ten, and then five is added to the result which then becomes a scaled score. This score is, in turn, converted to a spelling age.

Sally realised a raw score of 59 correct words which was converted to a scaled score of 10 years 11 months. This reflected a spelling discrepancy of 2 years 2 months below Sally's chronological age. Spelling errors which may overlap into different error categories included the following:

- insertions (particularly of bound morphemes) - broaches for broach; customerly for customary; cenptionly for cemetery; perperlitaly for permanent; intervally for individual; immetianly for immediate; accreaitly for accredited
- substitutions - slippering for slippery
- transpositions - lirbary for library; driect for direct; simliar for similar; clam for calm; genreous for generous; apperatice for appreciate; matrailly for materially
- omissions - eariest for earliest; headace for headache; especially for especially; bagan for bargain; fimarir for familiar
- fricatives [ʃ] - custion for cushion; intersion for institution; sussfullsion for sufficient

- other general errors: launch for lodge; pantistly for polcy; ostrater for orchestra; manylir for merely; interlictic for enthusiastic
- syllabification - numerous errors noted in analysis (segmenting) and synthesis (blending).

5.2.1.8 *A reflection of Phase One pre-tests*

The abovementioned criterion referenced tests, were conducted with the research participant, Sally, before the commencement of the THRASS programme. These tests revealed the levels at which she had acquired specific skills related to language and literacy at the time of testing. The norm-referenced tests ranked Sally in terms of reading and spelling achievement in comparison to the highest and lowest levels of achievement of a broader *hearing* population and these raw scores were converted to scaled scores.

The results of the pre-tests indicated the following:

- A consistent pattern of speech sound production errors emerged
- Sally could not work from whole-to-parts using informed spelling choices or phonemes
- Sally sometimes refused to analyse and synthesise unfamiliar words
- Sally did not use the rules of syllabification to 'chunk' unfamiliar words into syllables
- Sally could not work from whole-to-parts or parts-to-wholes. She seemed to make use of whole word gestalt, relying more on the orthography of words as opposed to the phonology of words. Deaf learners often rely on the visual modality to read and spell as opposed to audition and phonology
- Morphemes were consistently omitted. Deaf learners have a tendency to omit affixes (pre-fixes and suffixes) as these are pitched in the higher frequencies of sound
- The norm-referenced Schonell reading test indicated a reading deficit of 4 years and 5 months
- The norm-referenced Burt reading test revealed a reading deficit of 5 years and 5 months
- The norm-referenced Schonell spelling test showed a spelling deficit of 2 years and 2 months

The quantitative results of the above pre-tests administered in Phase One of the research undertaking yielded a baseline assessment prior to the introduction of the THRASS literacy intervention programme. The next phase of the research undertaking involved the implementation of the programme with the participant, Sally, over a school year.

5.2.2 Phase Two data analysis of findings

5.2.2.1 *Introduction*

The second phase of the research and data analysis was framed within the qualitative paradigm and comprised an overview of the observations recorded over the three terms of the school year during which the participant, Sally was introduced to and interacted with the THRASS programme. The observational data collected were analysed to identify emerging patterns in terms of the progress made by the research participant as well as in respect of error analysis. A detailed record of lesson plans, observations and findings was kept by the researcher in a journal and lessons were recorded. In order for the reader to gain insight into how the intervention took place, an overview of the process of implementing the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme is discussed below. This is followed by a discussion and analysis of observations and findings.

5.2.2.2 *The Phase Two intervention process*

The aim of this study has been to evaluate the Implementation of the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme with an Intermediate Phase deaf Gauteng learner using the spoken language approach. The first phase of the study involved the pre-test stage during which the research participant's literacy proficiency levels were evaluated, and a diagnostic error analysis was performed after each test. The implementation of the THRASS programme over a period of a school year, together with the observations, fieldnotes and recordings, has formed the bedrock of phase two data collection, analysis and interpretation of findings.

The implementation of the THRASS programme with the research participant, Sally, took place at two different levels. Firstly, THRASS was taught at class or group level for 30 minutes three times per week. During these lessons a collaborative, differentiated co-teaching strategy was employed whereby, as the class educator was facilitating the THRASS lessons, the researcher was facilitating the research participant by interacting with her face-to-face. The raison d'etre behind this was to offer Sally direct, intense re-instructional support in order to facilitate her ability to make full use of her speech reading skills, coupled with her residual hearing complimented with the aid of cochlear implants. Additionally, the researcher used the strategy of teaching Sally Cued Speech (see section 2.3.1.3 for a discussion on Cued Speech) together with the corresponding IPA symbols (see Table 2.3 for IPA vowel sounds and symbols) to help her disambiguate the phonemes and words being taught during each lesson.

Additional one-on-one support sessions also took place for 45 minutes three times per week after school hours. Whatever was covered in each class session was reinforced during the subsequent individual lesson. However, these lessons were structured differently because the researcher took on the primary role of educator in order to facilitate the research participant, Sally, as she interacted with the Phoneme Machine (see section 3.1 for a discussion on the Phoneme Machine) which incorporates the Cued Speech option and the IPA symbols. The research participant was then given additional written resource material so that she could implement and practice what she had just been taught with regard to Cued Speech, IPA symbols, phonemes, word recognition of high frequency words, and word analysis and synthesis. The THRASSIT, SOUND-IT-OUT and SING-A-LONG software (see section 3.1 for a discussion on THRASS resources) was also used to reinforce teaching and learning. During the collaborative co-teaching lessons the class teacher took on the role of gathering observational data for the purposes of discussion.

The Phases and Stages of the THRASS programme were taught in a systematic integrated, holistic manner and adapted to suit the range of needs and abilities of the Intermediate Phase group of learners. A full discussion on the Teaching Handwriting, Reading and Spelling Skills Programme (THRASS), together with the available resources, was handled in chapter three of this report. However, it is pertinent to briefly reflect on the skills that were covered during the implementation of this programme and the additional resources that were utilised:

- Every lesson began with familiarising learners with the geography or landmarks, pictures, keywords, and the associated consonant and vowel phonemes and graphemes of the THRASS Picturechart, Wordchart and Graphemechart together with the corresponding IPA chart symbols. Wall charts and desk charts were used in conjunction with the Raps and Sequence CD. Songs were introduced in stages using the Sing-A-Long Book. Learners engaged in multi-sensory learning wherever possible. (See section 3.1 and 3.2 for a discussion on the THRASS programme)
- The charts were used to explore cross-curricular themes and subject areas in order to scaffold lexical development and facilitate environmental application. Language elements or parts of speech such as compound words, different categories of nouns and verbs, adjectives, adverbs, synonyms, antonyms, homonyms, rhyme, alliteration, phrases, sentences and story development were investigated. The critical elements of listening and speaking - which underscore the development of systematic phonics instruction, reading and writing acquisition - were emphasised. (See section 3.2.3 for a discussion on Phase One of THRASS)
- Consonant and vowel graphs, digraphs, trigraphs and quadgraphs, collectively known as graphemes, were explored and discussed. Dictionaries and a variety of print media were

used to build up word lists associated with the phonemes and the corresponding graphemes on the chart. (See section 3.2.1 for an overview of THRASS).

- The weekly spelling word lists were taught by referring to the phonemes and graphemes on the THRASS charts that made up each word. Explicit teaching relating to the phonological aspects of the words took place. The spelling lists consisted of groups of words or word families that reflected the same orthographic patterns (e.g. 'hair', fairy', 'staircase', 'despair', 'airbag'). These words were used in phrases, sentences and stories to scaffold vocabulary development. Learners were encouraged to suggest more words to expand each list.
- Analysis (breaking up words into constituent phonemes to facilitate spelling) and synthesis (blending individual phonemes from left to right to create words when reading) formed an important part of each lesson. Learners were facilitated in identifying words by segmenting these words into individual phonemes; identifying graphemes and then identifying syllables in order to 'chunk' words according to the phoneme sequence in words (See section 3.2.4 and 3.2.5 for a discussion on Phase Two and Three of THRASS).
- Deletion and substitution manipulation activities were also investigated in order to explore phoneme sequences in words. For example, the word 'ball' on the chart was changed to 'call', 'fall', 'gall', 'hall' 'mall', 'tall' and 'wall' by substitution in order to reinforce onset and rhyme (*b*-all, *c*-all etc.) whereas the word 'hand' was changed to 'had' or 'and' by deletion.
- The 500 high frequency base words in Phase Four, Stage 10 (T10) were taught progressively and sequentially in an integrated manner as a whole-word approach by using a variety of resources. (See section 3.2.6 for a discussion on Phase Four of THRASS).
- Although the 44 phonemes (24 consonants and 20 vowels) on the charts, together with some of the songs, were revised in every lesson, intense focus was applied to specific rows of consonants and vowels and their corresponding songs over the three terms. Thus, 8 consonant phoneme boxes were dealt with extensively in each term; 7 vowel phoneme boxes were explored in detail in terms one and two; and the last six vowel boxes were studied intensely in term three.
- The THRASS dictionaries were initially used to build up a database of words for each phoneme box. However, the researcher felt it was necessary to develop an alternative word bank book because the THRASS dictionary filled up too quickly and did not allow sufficient space for the exploration of each word. This redesigned book contained a copy of each song, the words from the THRASS dictionary as well as the many cross-curricular lists of words explored over the months. These words were analysed into parts

(individual phonemes) and then synthesised by 'chunking' the words into syllables. Dictionaries were used to find the meanings of unfamiliar words and to record the corresponding IPA symbols in order to facilitate pronunciation. (Refer to appendix I).

- Various resources such as magazines, text books, workbooks and worksheets were used in the class lessons to reinforce concepts taught and to support the learners in the application thereof. This addressed the need for authentic reading experience. Skills such as listening, speaking, reading, viewing, writing, thinking, reasoning and the elements of language structure were contextualised in an integrated manner.
- An additional resource was used during the one-on-one support sessions with the research participant. The MacMillan English Focus on Texts series was chosen, as each narrative was accompanied by activities which reflected all elements of the language arts. Twelve units per term were covered.
- The Phoneme Machine together with the IPA symbols, cued speech posters, a pronunciation dictionary and the Cued Speech option on the Phoneme Machine with video clips, were used extensively in the one-on-one support sessions.

5.2.2.3 *Observations and error analysis*

In order to identify emerging patterns and overarching themes as they develop from the data analysis, the observations over the three terms in respect of articulation, reading and spelling skills have been analysed in the same way that the criterion referenced and norm referenced pre-tests and post-test were analysed. It is not within the scope of this research report to record every single error observed – only those error patterns that occur frequently are noted. It must be pointed out that some errors may fall into more than one category. The THRASS programme involves teaching at *word* level and this has necessitated the need to record errors at word level. As there is no set of prescribed procedures or an explicit system for the analysis of raw data, the researcher has used her professional judgement in this regard. In the ensuing lists of errors noted, the error always appears first and it is separated from the correct response by an oblique symbol (/). Many of the errors observed are typical of learners who are deaf or hard-of-hearing. (See section 2.6.5.3 for a discussion on language acquisition in deaf and hard-of-hearing children; and 2.6.6.4 for a discussion on reading acquisition in deaf and hard-of-hearing children)

Errors of articulation or phonology (speech sound production) were reflected in the following words:

- consonant plosives (k/g; p/b; t/d) - tuck/duck; pook/book;frok/frog; bet/bed; ekk/egg; tikra/tiger; dap/tap; dape/tape; klimmer/glimmer; disappointet/disappointed; koose/goose; coot/could; dunk/dung; shoot/should; woot/would; pushes/bushes; younker/younger;

puddink/pudding; hummink/humming; propes/probes; pursing/bursting; prush/brush

- consonant plosives for consonant fricatives (d/th; t/th; s/th) - dumb/thumb; dey/they; dat/that; dem/them; tink/think; something/something; brudder/brother; feddah/feather; de/the; tread/thread; togeddah/together; dere/there; birtday/birthday; true/through; taught/thought; wealt/wealth; aldough/although; muddah/mother; trust/thrust
- consonant fricatives (h; f/v; s/z) - sip/zip; fiss/fizz; sebra/zebra; sipper/zipper; lift/lived; sift/sieve; nossle/nozzle; drissle/drizzle
- nasals for liquids (n/l) - ludge/nudge; kink/king; namb/lamb; naser/laser; naddah/ ladder; lutritiuos/nutritious; sneeve/sleeve; nabour/labour; jourley/journey; night/light;
- short vowel monophthongs - ent/ant; mom/mum;
- consonant affricatives (ch/j; [t͡ʃ]/[d͡ʒ]) - sled/sledge; orich/orange; chanch/change; machine/machine [t͡ʃ/ʃ]; voyich/voyage; doch/dodge;
- liquids or laterals (r) - conner/collar;
- diphthongs - borrow/borrow [aʊ/əʊ]
- morphemes - cherring/cherry; parch/parched; push/pushed; snacktis/slackest; blacktis/blackest

Reading errors were classified into the following categories, bearing in mind that errors may fall into more than one category:

- misreads - gig/gig (d͡ʒ); genjill/gentle; am/aim; keept/kept; flonder/flounder; hospitalty/hospitality; girly/gurgling; coincide/coincide [ɔɪ]; groped/groped [ed/t]; enevous/envious; suspikous/suspicious; fluent/fluent [uː/uːə]; audience/audience [aɪ/iə]; chandelier/chandelier [t͡ʃ/ʃ] and [aɪ/iə]; vehicle/vertical; browned/proud; towed/towed [aʊ/əʊ]
- insertions - hestitate/hesitate; fundge/fudge; velvest/velvet
- omissions - stick/sticker; drill/drilled; taste/tasted; phase/phrase; wag/wagged; obedent/obedient; activies/activities; squirt/squirted; strengthen/strenghthened; possess/possession; varous/various; adventure/adventurous; orphan/orphaned; notorus/notorious; condition/conditioned; oblivon/oblivion; warror/warrior; lum/lump; hummy/humming; crown/crowned
- transpositions - gaps/gasp; baks/bask; aks/ask; claps/clasp; duks/dusk; crub/curb; swril/ swirl; boidegradaple/biodegradable (p/d); appalled/applaud; form/from; calms/claims; campiagn/campaign
- substitutions - jodge/judge; mercy/mercy [k/s]; hundle/hurdle; model/mobile; injury/injure
- refusals - barge; jiffy; gin; juniper; jubilant; phantom; kaleidoscope; seizure; insurance; leisure; gnat; pneumonia; reign; bruise; technician; tough; rough

The below-mentioned spelling errors, which may overlap into different error categories, came to the fore:

- insertions - breezze/breeze; carelessly/careless; patteren/pattern; simialar/similar; exisits/exists
- omissions - squbble/squabble; cap/cape; fercious/ferocious; peck/pecked; tip/tipped; sharpen/sharpened; movment/movement; explores/explorers; manger/manager; parch/parched; stitch/stitched; hight/height; overjoy/overjoyed; thirty/thirsty; vegtables/vegetables; clench/clenched; musican/musician; determine/determined; direct/directed; hospility/hospitality; avities/activities; discussted/discussed; seconly/secondly; rush/rushed; want/wanted; steam/stream
- transpositions - blancony/balcony; balckest/blackest; defaint/defiant; perpare/prepare; percaution/precaution; chrip/chirp; gaint/giant; calissic/classic; premanent/permanent; pervous/previous; blamy/balmy
- substitutions - realage/really; think/thick; creeture/creature; thirty/thirteen; peaches/perches; lift/lived; ninety/nineteen; boilt/boiled; surfifal/survival; crookt/crooked; chauk/chalk; shore/shawl; canoo/canoe [u:]; cuddly/cuddle
- long vowel monophthongs - ballon/balloon;
- vowel diphthongs [aʊ] - mold/mould
- fricatives (f/v; s/z; sh [ʃ]) – snoose/snooze

The pattern of errors noted above in the areas of articulation, reading and spelling during the three terms will be compared with the patterns of errors recorded in the pre-tests and post-tests in order to reach a conclusion in respect of how effective the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme has been in supporting the literacy development of an Intermediate Phase deaf learner who uses the spoken language approach. It must be borne in mind that THRASS is a Whole-Picture Keyword Phonics programme developed primarily for Word Level Teaching in English. The building blocks are the 44 phonemes (sounds) which comprise of 24 consonant phonemes and 20 vowel phonemes. These 44 phonemes encapsulate the 120 keygraphemes (spelling choices) which include 60 consonant graphemes and 60 vowel graphemes.

5.2.2.4 *The Phoneme Machine and Cued Speech*

Particular reference needs to be given to the role played by the Phoneme Machine which incorporates the Cued Speech option, as one of the objectives of this study has been to assess the extent to which this software programme has supported the learner in question. The Phoneme Machine software programme makes use of moving human lips to demonstrate how

the 44 phonemes or sounds are pronounced in the 120 main spelling choices of the English language and how the phonemes are blended together from left to right to form words. One can thus analyse the parts and blend them to form whole words. This section of the software is called the Phoneme Grid. (See section 3.1 for a discussion on the Phoneme Machine). There is an IPA option to make visible the International Phonetic Alphabet symbols above each corresponding set of human lips. IPA is most useful as a guide to accurate pronunciation because British English comprises 26 letters, but there are 44 sounds. (See Table 2.3 for IPA symbols). Deaf and hard-of-hearing learners cannot always 'hear' how certain words are pronounced, and they cannot always obtain accurate information in respect of pronunciation from the written word. The Cued Speech option shows the corresponding hand-shapes for the consonants and the vowel positions around the face and neck. In addition, there is a Cue Word option where a video of a Cued Speech transliterator demonstrates the cueing procedure for each word. (See section 2.3.1.3 for a discussion on Cued Speech). The other section of the software is the Word Grid which incorporates the 500 base words and also features the Cued Speech option together with word analysis and synthesis. It is both a bottom-up and a top-down approach. (See section 2.6.6.3 for a discussion on approaches to reading acquisition). The visual support offered in terms of moving lips, hand- shapes and positions, and video clips of a Cued Speech transliterator is an essential element in supporting auditory-based phonological awareness and phonics. Learners who are deaf and hard-of-hearing rely extensively on the strength of their visual modality to augment their compromised auditory modality.

The Phoneme Machine together with the Cued Speech option was used extensively throughout the intervention. The function of Cued Speech, which is a phonemic-based system, is to support deaf and hard-of-hearing individuals by providing visual access to the auditory phonological structure of spoken language. This facilitates the ability to disambiguate phonemes and syllable structures which can be confused when these individuals rely on speech reading and residual hearing alone.

In order to evaluate the extent to which Cued Speech facilitated the research participant's ability to disambiguate phonics, a number of assessments were carried out during the three terms. These assessments were in the form of small word-pair or group tests. Pairs or groups of words, which are difficult to speech-read because the mouth movements are very similar, were dictated to the research participant who relied on speech-reading and residual hearing alone, and subsequently by adding visual cues in synchronicity with spoken words to provide a visual portal to auditory-based phonemes. The words were mostly taken from the printed THRASS dictionary which incorporates the 500 base words and the 120 keywords. The test results tabled below indicate some of the word-pairs or groups tested, the score obtained without incorporating Cued

Speech and the score achieved when Cued Speech was used in synchronicity with speech.

The research participant, Sally obtained a score of 98/220 in the 22 word-group tests when she relied on speech reading and residual hearing supported with bilateral cochlear implants. However, Sally achieved 100% in the tests where Cued Speech was added as a visual component to augment speech reading in partnership with residual hearing aided by cochlear implants

Table 5.1: Cued Speech Tests

Word-pairs or groups	Speech reading	Cued Speech
Am/an/and (final consonant nasals/liquids/plosives)	5	10
Back/black (medial liquids/laterals)	5	10
Had/hand (final nasal/plosives)	2	10
Hat/had (final consonant plosives)	6	10
Of/off (final consonant fricatives)	3	10
But/putt (initial consonant plosives)	6	10
For/fur (medial short vowel monophthongs)	6	10
Eyes/ice (final consonant fricatives)	2	10
Glue/clue (initial consonant plosives)	3	10
Hear/year (initial consonant fricatives/semi-vowels)	2	10
Leg/led (initial consonant plosives)	4	10
Live/lift/left (medial short vowel monophthongs/final consonant plosives/fricatives)	4	10
Thick/think (final consonant fricatives/nasals)	4	10
Mom/mum (medial short vowel monophthongs)	8	10
Closed/clothes/close (final consonant plosives/fricatives)	4	10
Fly/fry (medial liquids)	8	10
Pear/bear Initial consonant plosives)	6	10
Halve/half (final consonant fricatives)	3	10
Park/bark (initial consonant plosives)	4	10
Witch/wedge (final consonant affricatives)	6	10
Rich/ridge (final consonant affricatives)	2	10
Lunge/lunch (final consonant affricatives)	5	10

5.2.2.5 *A reflection of Phase Two intervention*

The observations and data obtained from the analysis of speech sound production, reading and spelling error patterns, as well as general behaviour patterns in respect of literacy development during the year of intervention yielded the following:

- The same pattern of errors in the area of speech sound production was noted throughout the intervention process
- Omissions of bound morphemes – particularly suffixes – was apparent in speech production reading, spelling and writing
- Sally struggled with words containing vowel diphthongs with contrasting monophthongs
- Limited lexical knowledge manifested in low levels of reading comprehension
- Writing skills were compromised due to lack of knowledge of morphological syntax
- Increased ability to segment unfamiliar words into individual phonemes
- Increased ability to 'chunk' unfamiliar words into syllables
- Increased ability to make the correct spelling choices
- The Phoneme Machine together with Cued Speech played a pivotal role in developing Sally's phonological knowledge-base so that she became increasingly confident with reading unfamiliar text of increasing complexity. Refusals to read words became less evident

The results of the above tests, the pre-tests in Phase One, together with the observations and data obtained from the analysis of speech sound production, reading and spelling error patterns, as well as a description of general behaviour patterns in respect of literacy development that emerged over the three terms, will be discussed in the next section which deals with the interpretation and discussion of findings. However, before this occurs, it is pertinent to evaluate the efficacy of the THRASS programme *after* intervention has taken place. In order to affect this, it is necessary to examine both the criterion-referenced tests and norm-referenced tests administered in Phase Three of the research undertaking in terms of results, observations and analysis.

5.2.3 Phase Three data analysis of findings

The third phase of the research undertaking centred on quantitative design and involved administering the *same* tests that were used prior to the launch of the intervention. Data analysis and interpretation culminated with the results obtained from the criterion-referenced and norm-referenced assessments or post-tests which were administered to the research participant *after* she interacted with the THRASS intervention programme over a period of time. These summative

assessments are essential for evaluating the efficacy of the intervention programme. The same protocol was put into place as during the initial testing affected in Phase One to ensure validity and trustworthiness. The same tests were conducted after a full year in order to increase the validity of the results. (See section 5.2.1.1-5.2.1.7 for a discussion on the tests).

5.2.3.1 *The THRASS 120 Reading Test*

Sally scored 120/120 which translated to 100%, which means that she is able to read all of the 120 keywords representing the 24 consonant phonemes and 20 vowel phonemes on the THRASS Picturechart. The following articulation errors were noted. However, these errors did not affect overall scoring as they form part of a consistent pattern of speech sound production errors noted from the beginning of the intervention:

- nasals for liquids (n/l) - namb for lamb
- consonant plosives for consonant fricatives (d/th) - dumb for thumb
- consonant plosives (k/g) – tiker for tiger

5.2.3.2 *The THRASS 120 Spelling Test*

Sally achieved a raw score of 120/120 which converted to 100%. She was thus able to spell all of the 120 keywords representing the 24 consonant phonemes and 20 vowel phonemes on the THRASS Picturechart.

5.2.3.3 *The THRASS 500 Reading Test*

A raw score of 495/500 was obtained which was reduced to a scaled score of 99%. Sally made the following reading errors. However, Sally made exactly the same errors in the pre-test and this could well indicate that some of these were errors could possibly be speech sound production errors as opposed to reading errors because there are certain sounds that cannot be discriminated successfully.

- misreads – off for of (f/v consonant fricatives); tower for tour (diphthongs)
- substitutions - mom for mum (short vowel monophthongs); Semtember for September (nasals/plosives)
- transpositions - aksed for asked

5.2.3.4 *The THRASS 500 Spelling Test*

Sally obtained a raw score of 499/500 which translated to 99,8%. Only one spelling error was made:

- Insertions: suddlenly for suddenly

5.2.3.5 *The Schonell Graded Reading Test (1971)*

The raw score achieved by Sally was 61 words and this was reduced to a scaled score of 10 years and 4 months which was approximately 3 years and 9 months below her chronological age at the time. The following types of reading errors were recorded:

- misreads - sherbet for shepherd (as this also reflected in the pre-test it could well be an error of articulation); i-lid for island (also evident in pre-test); gillome for gnome; attritive for attractive; noserit for nourished; audurinse for audience; ostricta for orchestra; campiyun for campaign; plausible [aʊ] for plausible; insituation for insertion; antiqueue for antique; krotesqueue for grotesque (k/g consonant plosives); itoesyncracy for idiosyncracy (t/d consonant plosives); bibirophy for bibliography
- insertions - thirsting for thirsty; crowned for crowd (also evident in pre-test); grandually for gradually; physicus for physics; solotist for solois; herotic for heroic; pinewnomia for pneumonia; preferentical for preferential; ficticatious for ficticious
- omissions - terrestril for terrestrial (diphthongs)
- substitutions - colony for colonel
- transpositions - genius for genuine; engima for enigma; obvilion for oblivion
- syllabification – errors in analysis and synthesis of phonemes. Sally tends to try and chunk words visually rather than looking at individual phonemes.

Speech sound production errors included the following:

- crowned for crowd (diphthongs); sherbet for shepherd (consonant plosives); and i-lid for island (liquids) could possibly be articulation errors rather than misreads because these same errors occurred in the pre-test.
- liquids and nasals - muk for milk; sloveny for slovenly; the word ‘preliminary’ was difficult for Sally to express; belligeret for belligerent
- consonant plosives (k/g, p/b, t/d) - krotesqueue for grotesque; somnampulist for somnambulist; atamant for adamant; ineraticaple for ineradicable; rescint for rescind
- affricatives:[dʒ] chudicature for judicature

5.2.3.6 *The Burt Graded Reading Test A (Revised Norms 1974)*

A raw score of 68 was obtained which was reduced to a scaled score of 10 years and 0 months. This reflected a reading age deficit of 4 years 1 month based on Sally's chronological age at the time of testing. Analysis of reading errors which may fall into more than one category revealed the following:

- misreads - beware as bewar; commint for commenced; contempiterous for contemptuous; effiscience for efficiency; uniqueue for unique; fatigoo for fatigue; influtill for influential; champion for champagne; fallection for falatious; alerate for alienate (diphthongs)
- omissions - twist for twisted (bound morphemes); emergy for emergency (bound morphemes); effits for events (fricatives f/v); scarely for scarcely; truding for trudging (affricatives); autobigraphy for autobiography; physican for physician (diphthongs); palable for palpable; ingratating for ingratiating (diphthongs)
- substitutions - fridge for fringe (may also indicate an articulation error as the same error reflected in the pre-test)
- transpositions - exhautisd for exhausted; consituationally for constitutionally

Errors of speech sound production were reflected in the following words:

- liquids and nasals - jourley for journey (also pronounced the affricative j [dʒ] as ch [tʃ]); lourishment for nourishment; apprehed for apprehend; motionness for motionless; ecolomy for economy
- affricatives (j [dʒ] as ch [tʃ]) - prochecting for projecting
- consonant plosives (p/b) - pinocular for binocular

5.2.3.7 *The Schonell Spelling Test B*

Sally realised a raw score of 67 correct words which was converted to a scaled score of 11 years 8 months. This reflected a spelling discrepancy of 2 years 5 months based on Sally's chronological age. Spelling errors which may overlap into different error categories included the following:

- insertions (bound morphemes) - slippering for slippery; generously for generous; immedicate for immediate; materically for materially; subterratly for subterranean; misteratly for miscellaneous
- substitutions - parken for bargain (consonant plosives b/p); simalar for similar; mearing for merely (bound morphemes); custermery for customary; apparaties for apparatus; immature for amateur

- transpositions - poilcy for policy; appericate for appreciate; frinartely for fraternally
- omissions - libary for library (liquids); suffient for sufficient; especally for especially (diphthongs); equipmet for equipment (nasals)
- affricatives (j [dʒ] as ch [tʃ]) – launch for lodge
- other general errors - intersion for institution; orcester for orchestra; intervetsally for individual; inthratic for enthusiastic; fermair for familiar; permenate for permanent; semarey for cemetery; acreaditor for accredited; portmantoe for portmanteau; polatersion for politician; mortaue for mortgage; exterate for exaggerate; arpentitiy for committee
- syllabification - numerous errors noted. Sally tries to chunk words by sub-vocalising and trying to re-auditorise

5.2.3.8 *A reflection of Phase Three post-tests*

The abovementioned criterion-referenced and norm-referenced tests were conducted with the research participant, Sally, *after* the THRASS intervention process was concluded. These post-tests, which were the same tests that were administered in Phase One, revealed the levels at which Sally had developed specific skills related to language and literacy after a year of interacting with the THRASS phonographic programme. The norm-referenced tests ranked Sally in terms of reading and spelling achievement in comparison to the highest and lowest levels of achievement of a broader *hearing* population and these raw scores were converted to scaled scores.

The results of the post-tests indicated the following:

- A consistent pattern of speech sound production errors was still evident
- Sally displayed an increase in the ability to use the rules of syllabification to 'chunk' unfamiliar words into syllables. However, she still reverted back to using vision in place of phonological knowledge at times when analysing and synthesising words
- Errors in respect of morphemes were still evident in reading and spelling
- Sally displayed the improved ability to segment and blend increasingly difficult, unfamiliar words during the reading process
- All criterion-referenced test results yielded improved results
- The norm-referenced Schonell reading test indicated a reading gain of I year 8 months
- The norm-referenced Burt reading test revealed a reading gain of 2 years 4 months
- The norm-referenced Schonell spelling test showed a spelling gain of 9 months, although the spelling deficit increased by 3 months

The quantitative results of the above post-tests administered in Phase Three of the research undertaking yielded a summative assessment after the conclusion of the THRASS literacy intervention programme. The quantitative data in this study has served to gauge, quantify and evaluate intervention outcomes in terms of changes in numerical test scores. The aforementioned criterion-referenced and norm-referenced tests were analysed to measure the level of success achieved by the research participant after the culmination of the intervention programme and to analyse the patterns of errors in the areas of speech sound production (articulation and phonology), reading and spelling. This is in keeping with the research problem statement which evaluates the extent to which the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme – which incorporates the uses of a Phoneme Machine with a Cued Speech option – may enhance the literacy levels of an Intermediate Phase learner who is deaf and who uses the spoken language approach.

The data gathered from the field during Phase One (pre-test phase), Phase Two (intervention phase) and Phase Three (post-test phase) constitute the parts of the research undertaking. In order to add unique insights into the educational processes that have taken place whilst researching the phenomenon or the case necessitates the coalescing of these phases to construct a larger mosaic. This larger mosaic is the big picture that is required in order to answer the following question: ‘’What has been going on here?” This question leads to the interpretation and discussion of findings.

5.3 INTERPRETATION AND DISCUSSION OF FINDINGS

5.3.1 Introduction

Since the whole is no greater than the sum of its parts, the analysis and interpretation of the three phases will be interconnected in order to construct a big picture. This big picture will bear a direct relationship to the aim of the study which relates to the efficacy of an intervention, and a discussion will ensue on how the findings may be interpreted.

The data gathered over the three phases in the aforementioned section will be discussed in terms of patterns of consistency that have emerged in the analysis of errors of articulation, reading and spelling before, during and after the intervention. Particular reference will be given to numerical scores achieved by the research participant at the launch and landing of this research undertaking. The concept of deafness and deaf education as discussed in chapter two of this report, as well as works of other scholars will be referred to in an attempt to interpret and discuss the research findings and arrive at sub-conclusions. Reference will also be made to information

gathered from artefacts, interviews, observations and field notes where pertinent.

5.3.1.1 *Interpretation and discussion of speech sound production errors*

The research participant uses to Auditory-Oral method of communication as the vehicle for acquiring language – this is also referred to as the spoken language approach. This approach entails the development of 'listening' skills through the channel of residual hearing augmented by amplification technology; and 'speaking' in terms of both the motor and the cognitive-linguistic aspects of speech sound production. (See section 2.3.1 and 2.6.4). There were numerous errors of speech sound production that were prevalent throughout the research process. Although speech sound production (articulation and phonology) per se is not a prominent part of the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme – which is the phenomenon being studied – listening and speaking skills are fundamental *precursors* for successful first language acquisition; and for the development of the language dimensions of form, (phonology, morphology, syntax), semantics (attaching meaning to written text) and pragmatics (the function of language). Success in the ability to read and write first language is reliant on the sound development of these language dimensions. The following errors were noted throughout the research undertaking. An asterisk (*) indicates that the consonant is voiced: (see section 2.6.4 for a discussion on speech sound production)

- Bilabial consonant plosives or stops – p/b*
- Lingua-alveolar consonant plosives or stops – t/d*
- Lingua-velar consonant plosives or stops – k/g*
- Lingua-alveolar nasal for liquids – n/l*
- Lingua-alveolar consonant fricatives – s/z
- Labio-dental consonant fricatives – f/v*
- Lingua-alveolar consonant plosives for lingua-dental consonant fricatives – t/th; d/th*
- Lingua-palatal consonant affricatives - j [dʒ] as ch [tʃ]

The child's ability to produce speech sounds and use those sounds to make words develops over the first few years of life to the point where the average 5 year-old is able to communicate much like an adult. Spoken language is acquired in various developmental stages through the vehicle of listening to the spoken word, and this is reliant on the ability to hear. The degree of hearing loss has a strong pervasive effect on speech development, and a profound influence on the expressive, cognitive and motor components of spoken language. (See section 2.2.3 for a discussion on degrees or levels of hearing loss and 2.6.4 for a discussion on speech sound production).The research participant, Sally, lost the ability to hear at the age of 20 months. According to Yule (1996) this would place Sally in the two-word, Linguistic Stage of language

acquisition (See section 2.6.3 for a discussion on phases of first language acquisition). The errors of articulation indicate that Sally's ability to produce speech sounds is compromised across the spectrum of both the manner (how) and the place (where) in which consonants are produced. It must be mentioned that consonants contribute more to the understanding of speech than vowels because consonants convey most of the word information and they function as breaking points by separating syllables and words. Consonant sounds are produced more softly in respect of intensity and they are higher pitched than vowels. As has been previously noted, hearing loss tends to increase at higher frequencies (See section 2.2.3 for a discussion on the degrees or levels of hearing loss). Thus, the inability to discriminate consonants affects overall speech intelligibility and comprehension. If speech *reception* is compromised it will affect speech *production,* and it must be reiterated that these listening and speaking skills underpin higher order skills in language acquisition such as reading and writing. Speech sound production also refers to the linguistic rule-based aspect of phonology and errors in this area are reflected in the higher order language skills of the research participant. (See section 2.6.4 for a discussion on speech sound production).

As has been previously stated, studies have shown that children tend to acquire phonemes in a certain order: the plosives or stops such as *p, b, t, d, k* and *g* and the nasals *m, n* and *ng* develop between the ages of 2 and 4 and the consonant fricatives such as *f, v, s, sh* and *s* as well as the semi-vowels or liquids (*l, r*) develop between the ages of 4 and 7. Sally suffered her hearing loss at the age of 20 months and hearing aids were fitted at the age of 25 months, but Sally did not respond well to these. Sally also suffered from recurrent bouts of otitis media and this also affected auditory input over a crucial period of time. The first cochlear implant was fitted at the age of 4 years and 3 months and the second unit was implanted at the age of 7 years and 3 months. Thus, Sally's ability to acquire phonemes during this critical phase of development was severely compromised. (See section 2.6.4.2 for a discussion on articulation and phonology in speech sound production).

An audiogram plotting Sally's ability to hear with the aid of bilateral cochlear implants was carried out during the research intervention. The pure tone audiometry test revealed that her right ear showed a 30 dB loss in loudness or intensity at 250 Hz, 500 Hz, 1 000 Hz and 2000 Hz with a 35 dB loss at 4 000 Hz. The left ear showed a 35 dB loss at 250 Hz, 40 dB loss at 500 Hz, 1 000 Hz and 2 000 Hz, with a 55 dB loss at 4 000 Hz. If the reader refers back to the classification of hearing loss in chapter two of this report, it indicates that, even in an aided condition, Sally still presented with a mild hearing loss in the right ear and a mild to moderate hearing loss in the left ear. (See section 2.2.3). Mild hearing loss affects 26-40% of speech signal, soft voices are difficult to hear even without background disturbances, and up to 50% of information in class

lessons may be lost. Between 41-55% of speech signal may be lost with moderate hearing loss with potential delays in speech production, syntax and lexical knowledge. Normal conversation would have to be at close range, face-to-face. Bearing the above information in mind, it stands to reason why it has been imperative to adopt the collaborative, co-teaching strategies in the classroom during group THRASS lessons and to offer additional one-one-one, face-to-face support in the subsequent private THRASS lessons. If the reader refers to the interviews carried out with Sally's mother (Appendix F), it will be noted that Sally went through a time when the external processor was removed from the left ear and, for a short while the right processor was also removed. In an unaided condition, Sally's pure tone audiometry test of the left ear showed a 100 dB loss in intensity at 250 and 500 Hz, and a 110 dB hearing loss at 1 000, 2 000 and 4 000Hz which indicates a profound hearing loss and the reliance of visual clues such as speech-reading and sign language. During this time, the use of the Phoneme Machine and Cued Speech played an invaluable role in supporting the research participant in the disambiguation of speech sounds. It was interesting to note that for the short period when both external processors were removed, Sally's expressive language deteriorated rapidly (See section 2.2.6.2 for a discussion on some approaches to language acquisition and language development).

Looking at the speech banana most of the voiceless consonants, (p/h/k/f/s/th) are composed of high frequency energies, but are weak in intensity (loudness), falling in the range 20-30 dB. (See Figure 2.2 for an audiogram of familiar sounds).The voiced consonants 'v' and 'g' also fall in this range. The voiceless consonant 'v' falls in the low frequency energy. Additionally, the nasals (n/ng) are low frequency sounds that border on 45 dB in intensity and the liquid/lateral 'l' sound is a low frequency sound at 50 dB intensity. Since Sally has a mild to moderate hearing loss in the total range of 30-45 dB, and the abovementioned phonemes fall outside or border this range, it would be difficult for her to perceive these sounds with clarity. However, it must be noted that the phonemes are not static in the speech banana because the composition of speech sounds is partially shaped by the preceding and subsequent sounds in an utterance – this is called coarticulation. Most of the consonants that Sally battles to articulate fall below her threshold of hearing i.e. what she *can't* hear. The literature review indicated that the voiceless 'th' [θ] sound is the weakest sound in the English language and the 's' is the phoneme used most regularly in the English language (See section 2.2.3 for a discussion on degrees or levels of hearing loss).

There is another factor that needs consideration in the matter of errors of articulation and phonology (speech sound production). Sally consistently makes errors of articulation by substituting lingua-alveolar consonant plosives for lingua-dental consonant fricatives (t/th [t/θ]; d/th* [d/ð]).). This is evident in all major native languages of India as previously discussed. Additionally, the 'v' is often pronounced as an 'f', and the 'z' is pronounced like the 's'. Sally's mother, who has featured so prominently in Sally's rehabilitation, also makes the same

articulation ‘errors’ (refer to interviews in Appendix F), and Sally has probably acquired these pronunciation differences through cultural transmission in her home environment. (See section 2.6.4.1 for an introductory discussion on speech sound production).

The errors of articulation and phonology have been interpreted and discussed in terms of hearing loss described in decibels across the various frequencies; the spectrum of speech sounds in the speech banana in terms of audibility; the age of onset of hearing loss; the ramifications in respect of spoken receptive and expressive language development, and the possible influence of cultural dialects on articulation. Previous mention has been made regarding the critical, reciprocal relationship between conversational language - whether it is spoken or signed - and the language of print – with the acquisition of language underpinning the development of print literacy. Print literacy encompasses the skills of reading *and* writing in a manner of circular causality. (See section 2.6.5.3 for a discussion on language acquisition in deaf and hard-of-hearing children). Having stated this, an interpretation and discussion of findings related to the reading aspect as part of the phonographic-based Teaching Handwriting, Reading and Spelling skills programme will ensue.

5.3.1.2 *Interpretation and discussion of reading errors*

Learning to read is a highly complex task since it requires coordination of the eye muscles so that the printed line of words can be tracked; laterality and directionality to follow the words in order from left to right; depth perception and the ability to discriminate the foreground from the background to be able to ‘lift’ the print from the page; spatial orientation and form constancy to interpret letter shapes or symbols and words; visual memory to retain the meaning of letters and sight words; visual sequencing ability to track the sequence of phonemes represented by graphemes in words; a grasp of sentence structure and grammar, and the ability to categorise and analyse. In addition, the brain must integrate visual cues (orthography) with memory and associate or map them with specific phonemes by the process of analysis and synthesis. For comprehension to take place the words must be associated with specific meanings and these contextual meanings must be retained while a sentence or passage is read. Studies have revealed a strong nexus between language deficits and reading disorders because language deficits are the underlying cause of reading disabilities. So how do children who are deaf or hard-of-hearing manage to learn such a highly complex task? Several studies have revealed that deaf readers use the strategy of combining the approach of whole-word recognition (gestalt), phonological recoding, and orthographic recoding to store information temporarily in working memory when reading text. This strategy is similar to the one used by their hearing counterparts. (See section 2.6.6.4 for a discussion on reading acquisition in deaf and hard-of-hearing children).

The research participant, Sally, made a number of consistent reading errors throughout the Teaching Handwriting, Reading and Spelling Skills (THRASS) intervention programme. It is essential to reflect on the possible reasons for these errors and to evaluate the efficacy of the THRASS programme in scaffolding the literacy levels of this learner by examining the results achieved in the reading pre-tests and post-tests. The following reading errors were noted:

- Omissions – by far the majority of errors involved the omission of morphemes. It must be born in mind that even a *slight* hearing loss (16-25dB) causes problems with clarity and hearing morphemes in tenses and plurals at the end of words. Bound morphemes are affixes such as prefixes and suffixes. Inflectional morphemes do not change the meanings of root words or free morphemes, but are suffixes attached to free morphemes to indicate grammatical structures such as plurality and verb tenses (Paul 2009:39). Reading errors were mostly made by leaving off the suffix '-ed' to denote past tense. Other errors included leaving off suffixes such as 'ing' and 's', as well as '-less' which is a derived morpheme. A number of errors were also related to the inability to read vowel diphthongs which are contrasted with two monophthong vowel sounds together to form two syllables such as in the words 'warrior', 'various', 'terrestrial', 'obedient' and 'soloist'. Numerous errors of syllabification were also noted. Although the abovementioned errors did decrease in intensity over the intervention period, they were still noted during the post-test phase.
- Insertions – although there were a number of these errors throughout the phases of the programme, there did not seem to be a distinct pattern of errors except that the letter 'n' was inserted more frequently in words, and letters were inserted in words which contained the vowel diphthongs which are contrasted with two monophthongs to form two syllables as in 'soloist', 'heroic' and 'fictitious'.
- Substitutions – short vowels were predominantly substituted in the beginning, but substitution errors became less prevalent as Sally advanced through the programme.
- Refusals – these were evident at the beginning and during part of the intervention. However, as Sally became more confident and competent in respect of analysing words into phonemes, chunking the words into syllables and blending the parts to form words, she did not feel the need to refuse to read unfamiliar words. The use of a dictionary, the IPA symbols and Cued Speech all played a definitive role here.
- Transpositions – these errors were noted throughout the programme and generally speaking Sally seemed to switch around a vowel and a consonant in a word. However, a pattern emerged where transpositions occurred frequently in words that had a 'sk' as in 'ask' or a 'ps' as in 'gaps'. The tendency to transpose letters became less frequent towards the end of the programme. This could be because Sally had developed an increase in phonemic awareness and was able to analyse and synthesize words more

successfully. However, one cannot rule out the possibility of underlying visual perceptual deficits which are generally the cause of transposing letters in words.

- Misreads – at the commencement of the programme Sally was misreading many relatively easy words. The pattern of errors indicated that a lot of guesswork was involved with little use of analysing words into their constituent phonemes before blending, syllabifying or chunking them to for words. Sally seemed to rely on recognising the *gestalt* or the whole word rather than using phonemic analysis as part of a word attack skill strategy. This is in keeping with her preference and reliance in using the visual modality as her area of strength. Misreads at the end of the programme involved more complex word structures. However, Sally seemed to make more errors with words containing vowel diphthongs with contrasting monophthongs forming two syllables once again. She also made errors with words ending in 'que' and 'gue'. It must be noted that articulation errors recorded with the consonant plosives f/v; t/d and p/b were also evident in the reading errors.

In order to evaluate the extent to which the THRASS intervention programme has supported the *reading* development of the research participant, the quantitative results of the reading pre-tests and post-tests warrant a comparative analysis. This will be presented in the table below.

Table 5.2: Results of Reading Tests

Name of Test	Pre-test Scores	Post-test Scores	Gain
THRASS 120 Reading Test	112/120 93,3%	120/120 100%	6,7%
THRASS 500 Reading Test	457/500 91,4%	495/500 99%	7,6%
SCHONELL Graded Reading Test (1971)	39 words 8 years 8months	61 words 10 years 4 months	22 words 1 year 8 months
BURT Graded Reading Test A (Revised Norms)	43 words 7 years 8 months	68 words 10 years 0 months	25 words 2 years 4 months

When comparing the scores at the commencement to the THRASS intervention programme to the scores gained at the culmination of the programme, it may be concluded that the programme in question, which is the *case* in this study, has enhanced the reading levels of this Intermediate Phase learner who is deaf because the difference between the pre-test and post-test scores may be viewed as statistically significant. Generally speaking, it is well-documented that the majority of

learners who are deaf or hard-of-hearing leave school at the age of 18 or 19 years of age with a reading level commensurate with the average 8 to 9 year old hearing student; and this equates with a grade four level of reading competency. Based on an average between the scaled scores of the two graded reading tests, Sally is reading at an average age of 10 years and 2 months. As has been previously stated, scholarly reports have concluded that the annual gain for many deaf and several hard-of-hearing students ranges from 2 to 3 months; this is compared to the average 1 year grade level gain for the many hearing students. (See section 2.6.6.4 for the views of various scholars on reading acquisition of deaf and hard-of-hearing children). Again, based on an average of gains achieved in the standardised reading tests, Sally has gained two years in reading proficiency in an intervention that took place over one school year. An interpretation and discussion of findings related to spelling skills as part of the phonographic-based Teaching Handwriting, Reading and Spelling skills programme will ensue to evaluate the extent to which this intervention has enhanced the spelling skills of the research participant.

5.3.1.3 *Interpretation and discussion of spelling errors*

As has been previously stated, not only is there a strong relationship between the spoken and the written word, but there is also a facilitative reciprocal relationship between reading and writing in that both processes involve letter-sound correspondence. Reading involves changing graphemes to phonemes by a process of decoding, whereas writing involves changing phonemes into graphemes by the process of encoding. Spelling per se is a writing skill involving choosing the correct grapheme to correspond to the phonemes of spoken language in any given word. However, a caveat is pertinent at this point; in the English language spelling is not simply choosing a grapheme to represent a phoneme. The English language is orthographically inconsistent, irregular and complex. In British English there are 26 letters which are used singly or in combination to represent 44 phonemes and English is thus considered a phonologically complex spoken language. (See section 3.3 for a discussion on approaches to phonics instruction). The Teaching Handwriting and Spelling Skills programme (THRASS) teaches the skills of reading and writing at Word Level concurrently by the process of blending phonemes when reading words and segmenting phonemes when spelling words. Spelling errors occur when the incorrect grapheme is chosen to represent a specific phoneme. The research participant, Sally made the following error patterns during the intervention programme:

- Omissions – these are also referred to as *deletions.* The majority of errors were noted with bound morphemes, particularly the inflectional suffix '-ed' that indicates the past tense of a verb. This particular suffix is called an *allomorph* because it takes on different shapes depending on the word it is attached to. This past tense morpheme takes on three variant pronunciations: *id* as in *directed; t* as in *tipped* and *d* as in *begged* (Paul

2009:42). The same pattern of errors was prevalent in reading. The liquid semi-vowel '*l*' was also omitted fairly frequently. Sally made frequent errors of this nature in speaking, reading and writing throughout the intervention programme which is indicative of a phonologically-based disorder of speech sound production.

- Insertions – of particular significance was the insertion of the inflectional morpheme '*-ly*' as a suffix at the end of words. This pattern prevailed throughout the intervention and it is almost as if Sally perseverated with this spelling error.
- Substitutions – these mostly involved the end parts of words. Errors were once again noted with bound morphemes (suffixes). Errors were also noted with consonant fricatives (f/v; s/z and sh) and affricatives (j/ch). These errors were also noted in articulation and reading.
- Transpositions – a number of errors were recorded where the vowel digraphs (long vowel monophthongs) and diphthongs such as '*ai', 'ee', 'ui'* were transposed. Additionally numerous errors occurred with words incorporating the lingua-palatal semi-vowel ''*r'* at the beginning of the word, and in particular '*per'* for '*pre'.*

Studies have illustrated that deaf children develop spelling patterns in a different way from their hearing peers. Hearing children tend to out-perform deaf children in the area of phonemic awareness (auditory modality), deaf learners tend to achieve better than their hearing counterparts in the concept of a word and word recognition (visual modality). Thus, deaf learners tend to develop more sequential techniques when learning to spell because they seem to rely more heavily on visual (orthographic) as opposed to auditory (phonemic) information. The visual information was accessed via the cueing systems of speech-reading, signing, fingerspelling and tactile-kinaesthetic feedback and this has a direct impact on their spelling patterns. This same phenomenon was evident during this research undertaking with the research participant.

At the commencement of the programme, Sally battled to listen to a word, break the whole word into its constituent parts by counting the syllables, and then make informed spelling choices by selecting the correct graphemes to represent phonemes. However, as she progressed through the intervention programme and made progress in using the spoken word in synchronicity with speech reading augmented by Cued Speech, she slowly became more skilled in breaking up or segmenting words and then chunking them into syllables and blending these to write words – she still had the tendency to segment diphthongs incorrectly, especially vowel diphthongs which are contrasted with two monophthong vowel sounds together to form two syllables. This is because she relies heavily on the visual modality and often segments the actual letter symbols in words *visually* as opposed to segmenting the phonemes *auditarily.* For example she would segment the word 'although' incorrectly as a/l/t/h/o/u/g/h by looking visually at the letters and then proceed to chunk it correctly as al/though by looking at the sets of vowels. Sally also relies on re-vocalising

and re-auditorising to try and segment words successfully. The use of the Phoneme Machine, together with the IPA symbols, the dictionary, and Cued Speech played an invaluable role here.

A comparative analysis of quantitative results obtained in the spelling section of the THRASS intervention programme is tabulated below. The scores obtained at the start and the conclusion of the intervention programme denotes a positive growth in the ability to spell keyword graphemes and high frequency or sight words with great success. Additionally, the ability to make informed spelling choices in respect of words with increasingly complex orthographic patterns has progressed by 9 months over a school year.

Table 5.3: Results of Spelling Tests

Name of Test	Pre-test Scores	Post-test Scores	Gain
THRASS 120 Spelling Test	99/120 82,5	120/120 100%	17,5%
THRASS 500 Spelling Test	435/500 87%	499/500 99,8%	12,8%
SCHONELL Spelling Test B	59 words 10 years 11 months	67 words 11 years 8 months	8 words 9 months

Spelling success is centred on the ability to sequence letters correctly and this is particularly problematic for deaf children. Deaf children tend to have difficulty with serially ordered presentation and recall which means that they are often incapable of phonologically encoding ordered sequences of items in the same manner as their hearing counterparts. The tendency to use the correct, or near-correct spelling choices (graphemes which represent phonemes), but then transcribe them onto paper in the incorrect sequence seems to be prevalent in several deaf learners. Thus the word ‘asked’ is scribed as ‘aksed’, almost like an anagram. Looking back at the transposition errors made during spelling, it seems evident that Sally also does this ‘anagram-type’ transcription with regularity.

Sally scored an age average equivalent of 10 years and 2 months in her overall reading ability in comparison to an age equivalent of 11 years and 9 months in her spelling ability which indicates that her spelling proficiency is 1 year and 7 months above her reading proficiency. Although deaf children do not generally attain reading literacy levels much beyond the fourth grade, they seem to experience more competence in the learning of conventional spelling. (See section 2.6.6.4 for a discussion on reading acquisition in deaf and hard-of-hearing children).

An analysis of the scores attained at the culmination of this research undertaking signify that the

results achieved in reading and spelling competency may be viewed as statistically significant in terms of positive literacy development. An objective of this study has been to evaluate the support role played by the Phoneme Machine, together with the IPA symbols and the Cued Speech option in achieving this outcome.

5.3.1.4 *Discussion of the Cued Speech option*

As discussed in chapter two of this research report Cued Speech is a system that uses eight hand shapes to represent groups of consonants with four different locations around the mouth and neck to represent vowels. This cueing system is used in synchronicity with spoken language as an aid to speech reading in order to remove the ambiguity of those speech sounds that look similar on the lips, and in this way Cued Speech allows visual access to auditory-based phonemes. Cued Speech thus supports the spoken word because it supplements speech reading ability – Cued Speech does not support the ability to hear. (See sections 2.3.1.2 and 2.3.1.3 for a discussion on the Auditory-Oral approach, and Cued Speech).

Speech reading (previously known as lip-reading) involves the skill of understanding the spoken word through observing the speaker's face. However, as previously mentioned, only approximately 20-30% of spoken English is visible on the lips, even in dyadic conversations, because many speech sounds look alike on the lips when words when 'listening' to the spoken word. For example, the consonant plosives p/b (park/bark); k/g (clue/glue); t/d (had/hat); the consonant fricatives f/v (half/halve); s/z (ice/eyes); consonant affricatives j/ch (rich/ridge) are just some of the phonemes that look the same on the lips, making it impossible to distinguish by speech reading alone without using the words in context. (See section 2.3.1.2 for a discussion on the Auditory-Oral approach).

In order to illustrate the role that Cued Speech played in supporting the research participant to disambiguate phonics, the researcher carried out a series of informal assessments during the intervention period. It must be noted that the purpose of Cued Speech is not to teach speech, but to scaffold the development of literacy. Therefore, Cued Speech transliterators do *not* use voice when they cue. The researcher did not use her voice when administering the tests – only cueing and silent mouthing of words in synchronicity was used as an aid to speech reading. This isolated Cued Speech and speech reading from residual hearing with the aid of cochlear implants (See section 4.3.4 for information on the researcher).

The scores obtained in the 22 word-group tests through the medium of speech reading in isolation amounted to 98 words correct out of a total of 220. This translated to an average of

44,5% of words correctly identified by speech reading alone. The research participant, Sally, achieved 100% in the tests where Cued Speech was added as a visual component to compliment speech reading. By way of example, if the words ‘hat’ and ‘had’ are cued, the hand shape for the ‘h’ is 3 fingers without the thumb and index finger, at the neck for the ‘a’ vowel sound, and ending with the neutral full hand position for the consonant ‘t’, but ending with just the index finger to represent the consonant ‘d’. The ‘t’ and ‘d’ may not be too easily distinguishable on the lips, but they are very easily distinguishable with the incorporation of Cued Speech. It has been previously mentioned that the discrimination of words by speech reading is also reliant on the effects of the surrounding sounds in a word and this is known as coarticulation. The results indicate that using Cued Speech in synchronicity with speech reading as a visual component to augment the auditory component of phonology and disambiguate phonics has resulted in a gain of 65,5%.

Recent scholarly articles have seemed to support the notion that Cued Speech supports the development of English literacy as well as the use of a phonological code. However, early exposure to Cued Speech is a critical factor because phonology, phonemic awareness and morphological structures develop in the early years. Early and intense exposure to Cued Speech augments the efficacy of processing phonological information and in acquiring grammatical morphology because morphemes are not easily accessed through speech reading alone. Morphemes are affixed to words or are short and unaccented, and as such are frequently not perceived and encoded, particularly in languages such as French or English. Cued Speech provides unambiguous information even in respect of unstressed syllables, thus helping to ameliorate the challenges deaf learners face in developing morphosyntactic knowledge. (See section 2.3.1 for a discussion on oral approaches and 2.6.3 for a discussion on phases of first language acquisition).

The research participant was only introduced to Cued Speech during the intervention programme. She has never used natural sign language or manual coded English. Sally made many errors involving both phonological and morphological structures in speaking, reading, spelling and writing. As she received increasing exposure to the Phoneme Machine, the IPA symbols, the use of the dictionary for pronunciation, and using Cued Speech to cue the dictionary words found in sentences and stories, she did show some improvement. However, she still has difficulty with morphosyntax.

During the intervention, it was observed that there were other areas of literacy development in which the research participant, Sally, lagged behind. Although these observations were not strictly associated with the research problem statement which questions the extent to which the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme – which incorporates the use of the Phoneme Machine together with the Cued Speech option – will enhance the

literacy levels of an Intermediate Phase learner who is deaf and uses the spoken language approach, the researcher is of the opinion that these observations need to be brought to light.

5.3.1.5 *General observations*

Data analysis in qualitative research is an inductive process whereby unique patterns emerge from the data as the research develops in the field over a period of time. During the intervention it came to light that Sally regularly made a number of language errors. It must be reiterated that although the (THRASS) programme focuses on Word Level teaching, the programme lends itself to cross-curricular, integrative activity. This means that knowledge derived from the Word Level programme is transferred to reading, reading comprehension and writing at Sentence Level and Story Level because words cannot be taught in isolation. As has been explained in the intervention process in this chapter, extensive use was made of a variety of resources such as textbooks, workbooks and language series to address the need for authentic reading experience and it was during this time that these observations were noted. The following observations were made:

- Lexical knowledge – although Sally became increasingly confident about analysing and synthesizing unfamiliar words, she displayed severe limitations in the understanding of word meanings, even in context, and this has a detrimental effect on her reading comprehension – she even faces challenges with cloze procedure exercises in which a list of words are given to choose from. Due to the age of onset of deafness and the resultant impact on language acquisition during a critical window of development, Sally may be labelled as being essentially 'language-deprived'. Reflecting back to the review of literature it has been declared that deaf students demonstrate vocabulary knowledge that is quantitatively diminished and that they acquire new lexical knowledge at a reduced pace. There is a strong correlation between lexical knowledge and comprehension. The more a person reads, the more expansive the lexical knowledge base; and the more extensive the lexical knowledge base, the more a person reads. This is an illustration of circular causality which supports the hierarchical development of learning to read in order to switch to reading to learn.

- Reading comprehension – Sally's ability to comprehend text is compromised and well below the level expected of an Intermediate Phase learner even at the literal level. With regard to level one literal comprehension skills which revolve around basic facts and details, Sally has the tendency to just take phrases out of the given text to copy. Level two comprehension skills involve drawing inferences from the text – information that is implied, but not stated. Level three comprehension skills comprise of higher order thinking skills such as analysis, synthesis application and evaluation. These skills

increase in importance as a learner progresses through the Intermediate Phase towards High School. Deaf learners have difficulty with drawing inferences from text and they do not realise they do not understand what they are reading because they have constraints in respect of their metacognitive strategies (See section 2.6.5.1 for a discussion on metacognition).

- Writing skills - Sally does not construct sentences correctly, making numerous errors with verb tenses, infinitives, plurals, auxiliary verbs and errors of concord i.e. morphological syntax. (See section 2.6.4 for a discussion on speech sound production). For example, 'my brother was excitement'; 'the stork must be ate all the food'; 'the children was screaming yesterday'; 'the happy farmer whistling'; 'some people is amused from other people'. A review of the literature has indicated that the level of written language development of many deaf and hard-of-hearing (DHH) learners is more or less the same as their reading development, and generally speaking, significantly below the levels of their hearing counterparts. Sally's teacher has indicated that Sally uses short, basic, repetitive sentences in written language. Her writing is concrete bound, the sentence structure is generally faulty and there are numerous errors with tenses and plurals. She omits words in sentences, uses words out of context and has compromised ready vocabulary knowledge. *Metalanguage* refers to the metacognitive skills in reading and writing and Sally's ability to think with reasoning, to think critically, reflect back on and construct meaning from text is compromised. (see section 2.6.5.2 for a discussion on Metalinguistics). It has been reported that the rate at which DHH learners develop their writing skills reduces as these learners enter the adolescent years. (See section 2.6.6.4 for a discussion on reading acquisition in deaf and hard-of-hearing children).

The data gathered during the research study has been analysed inductively and the results thereof have been interpreted and discussed in order to create a big picture of what has been happening in the field. The works of other scholars have been engaged to contribute to the interpretation and discussion of the research findings. The thesis problem statement centres on implementing the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme with an Intermediate Phase deaf learner using the spoken language approach. The thesis statement has been tested and a number of sub-conclusions may be posited in order to reach a final conclusion about the thesis statement. In presenting the sub-conclusions it is pertinent to reflect back on the sub-questions submitted in chapter one of this study. The raison d'etre is to assimilate what the study intended to achieve with what has been achieved at the culmination of the study. Based on the outcomes of the research, the following sub-conclusions may be tendered in tandem with the sub-questions posed in chapter one of this study:

- Deafness has a pervasive influence on the acquisition of language and this has a profound, exponential impact on the development of the higher skills of print literacy. The age of onset of deafness plays a critical role in the development of language acquisition, and early intervention is paramount. The sub-questions relating to the nature of deafness and how children acquire language has been addressed
- The spoken language approach is a method of communication that places emphasis on 'listening' and speaking, with the aid of residual hearing and amplification technology in combination with speech reading ability. The emphasis is on developing audition in contrast to signing where the emphasis is on visual-gestural language. The question involving the approaches in deaf communication methods has been attended to.
- The question was put forward as to the extent the Teaching Handwriting, Reading and Spelling Skills (THRASS) literacy programme – which employs a phonographic method to support language acquisition at Word Level – may support the literacy development of an Intermediate Phase deaf learner who uses the spoken language approach. The sub-conclusion reached is that the THRASS programme has had a significant influence in enhancing the literacy development of this deaf learner. This is reflected in the statistically significant scores attained at the culmination of the programme.
- The question was raised regarding the utility of the Phoneme Machine which incorporates the Cued Speech option and how this software may support a deaf learner's ability to disambiguate phonics. The sub-conclusion reached is that the Phoneme Machine has been instrumental in supporting the research participant's ability to analyse and synthesize words and this has, in turn, impacted favourably on her ability to read and spell more proficiently. The Cued Speech option of the Phoneme Machine has been pivotal in supporting this learner's ability to disambiguate phonics, and it has impacted on her ability to gain visual access to the spoken word which cannot be successfully accessed by speech reading alone.
- The question relating to the role played by phonology in developing the literacy skills of a learner who is deaf was addressed. The sub-conclusion reached is that this deaf learner has been able to gain access to auditory-based phonology and this increased knowledge of phonology has played a definitive role in developing the literacy skills of the research participant. Additionally, the linguistic rule-based aspect or phonology of speech production has a direct impact on higher order literacy skills.

5.4 SUMMARY OF CHAPTER FIVE

The aim of this chapter has been to analyse and interpret the findings from the data collected from various sources during the time spent in the field during this research undertaking. The

findings were presented to the reader in the form of observations and discussions with particular reference to error analysis and patterns emerging from the data during interim analysis.

The results of the phase one pre-tests and phase three post-tests - which marked the launch and landing of this research undertaking - were analysed and discussed in terms of arriving at a conclusion based on the research problem statement. This statement postulated the extent to which the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme – which incorporates the use of a Phoneme Machine together with a Cued Speech option – may enhance the literacy levels of an Intermediate Phase learner who is deaf and who uses the spoken language approach.

Phase Two of the research undertaking involved giving the reader a brief overview of how the THRASS intervention programme was undertaken and of what transpired during the actual educational intervention process which took place over a school year. Patterns of errors were noted in the areas of articulation and phonology (speech sound production), reading and spelling. These patterns were compared with the patterns of errors recorded during the pre-test and post-test phases.

A brief discussion of the Phoneme Machine and the utility of the Cued Speech option ensued. The results of informal assessments carried out with the research participant were presented in order to illustrate the efficacy of incorporating Cued Speech, together with International Phonetic Alphabet (IPA) symbols, to support the disambiguation of phonemes and syllable structures as well as provide a visual access to an auditory-based phonological code.

The observations and error analysis in each of the three phases were merged to create a holistic impression of what has transpired during the research study and these findings were interpreted and discussed. The works of various scholars, which were discussed in sections of the literature review, were referred to in order to substantiate the interpretations and research findings.

A number of general observations regarding the literacy proficiency levels of the research participant were made and information gathered in the literature review was used to add light to the reasons why these phenomena were prevalent in learners who are deaf or hard-of-hearing.

The chapter culminated with a reflection of the problem statement and the positing of a number of sub-conclusions which emanated from addressing the sub-questions in chapter one of this study, and analysing and interpreting the findings. These sub-conclusions will form the foundations towards reaching a final conclusion in respect of answering the research statement.

The final chapter rounds off what was started in the introductory chapter. Conclusions will be reached in relation to the research problem statement. Themes that emerged from the literature and findings will be examined and the utility of the THRASS programme for deaf and Hard-of-hearing learners will be deliberated on. This will be followed by the recommendations for implementation. The limitations of the study and the recommendations for future research will be considered before the final conclusion of this dissertation is reached.

CHAPTER SIX

FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

6.1 INTRODUCTION

> Those of us willing to accept a role in the lives of deaf children constantly have to challenge assumptions about what deaf children can and cannot do, and we must explore new avenues to allow them to reach their potentials. Therein lies the pursuit of excellence both for deaf children and those who love them (Marschark 2009:xiv).

It has been frequently documented that the majority of learners who are deaf or hard-of-hearing do not achieve reading levels much beyond the level of Grade Four upon graduation from High School, and these learners consistently lag behind their hearing counterparts in all areas pertaining to literacy development. It has been argued that language and reading acquisition is qualitatively similar yet quantitatively different in deaf and hard-of-hearing individuals. Questions that have often been asked include, “Do deaf or hard-of-hearing individuals develop literacy skills in the same way as hearing children do?’’; ‘’Do these learners acquire print literacy through the vehicle of auditory-based phonology, or do they rely more on visual learning and orthography?’’; ‘’What constitutes best practice in supporting the language acquisition and literacy development of these leaners?’’ The National Reading Panel (2000) cited five critical components of reading instruction, namely phonemic awareness, phonics skills, fluency, vocabulary and comprehension. Chall’s Stage Model postulated the pivotal role played by Stage 0 phonemic awareness and Stage 1 phonics as precursors to fluency, vocabulary development, text comprehension and higher order thinking skills. Although still a much-debated topic, there is a growing body of evidence that suggests that the strategy of teaching phonemic awareness and phonics skills, supported by visual components such as Visual Phonics and Cued Speech has the ability to develop a phonological code in deaf and hard-of-hearing individuals to support their literacy development. It is against this milieu that the research study took place.

The title of this study is ‘’ Implementing the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme with an Intermediate Phase deaf Gauteng learner using the spoken language approach’’. Therefore, the aim of this research undertaking has been to evaluate the extent to which the Teaching Handwriting, Reading and Spelling Skills (THRASS) literacy programme – which incorporates the use of a Phoneme Machine with a Cued Speech option – may enhance the literacy levels of an Intermediate Phase learner who is deaf and who uses the spoken language approach to communication.

The research design of case study was selected for this exploratory research in respect of the efficacy of the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme, the latter being the phenomenon under study. The research participant, Sally, a deaf Intermediate Phase learner who uses the spoken language approach, interacted with the THRASS programme over the period of a school year. The study took place in an inclusive setting in an Independent School.

The research was framed principally within the qualitative paradigm based on Interpretivist philosophy, although the conception and conclusion of the undertaking were framed within the quantitative paradigm; thus encompassing mixed-methods, evaluative methodology. The research undertaking spanned over three distinct phases. Phase One involved the administration of pre-tests to form a baseline assessment; Phase Two comprised of the THRASS intervention process and Phase Three consisted of the administration of post-tests to form a summative assessment.

The primary purpose of this final chapter is to present the reader with a comprehensive overview of overarching themes and salient points that have emerged from the data in respect of the problem statement and the aim of the study by linking the information gleamed from the literature review to a summary of the research findings. This will provide a nexus to the above research problem statement and this will be the conduit to recommendations for future research. The limitations of the study will be discussed before reaching the final conclusion of this research undertaking.

6.2 THEMES THAT EMERGED FROM THE LITERATURE AND THE FINDINGS

6.2.1 Introduction

In reviewing the problem statement one can see the interplay of key elements. Firstly, there is the THRASS programme which is the phenomenon under study or the *case.* Secondly, there is the research participant, Sally – a deaf Intermediate Phase learner who uses the spoken language approach. Thirdly, there is interaction between the case study (in this instance it is a literacy programme) and the research participant, which yields results that may be referred back to the problem statement and the aim of this study. Bearing this interplay of key elements in mind, a synopsis of the THRASS programme will be given. This will be followed by a brief review of the research participant, Sally before a summary of the findings is given.

6.2.1.1 *The THRASS programme as case study*

Chapter Three of this report was devoted to an in-depth discussion of the Teaching Handwriting, Reading and Spelling Skills (THRASS) literacy programme and Chapter Five (see section 5.2.2) detailed how the intervention took place during Phase Two of the research undertaking. However, it is pertinent to reflect back on the most salient features of the THRASS programme in order to put the findings in perspective:

- THRASS is a whole-school picture and associated keyword phonics programme which teaches the relationships between the 26 letters of the alphabet (graphs), the 44 speech sounds (phonemes) of spoken English and the 120 spelling choices (graphemes) of written English to develop knowledge of the fundamental building blocks of phonology and enhance phonemic awareness. (See section 3.1).
- This phonographic method is based on the Alphabetic Principle. (See section 3.3).
- THRASS uses a multi-sensory teaching strategy through the combination of visual, auditory and kinaesthetic (VAK) learning. (See section 3.2.1).
- THRASS is concerned with Word Level Teaching whereby the reading process involves converting graphemes into phonemes by blending individual phonemes together, and the spelling process involves converting phonemes to graphemes by segmenting the phonemes. (See section 3.2.1).
- THRASS incorporates both the synthetic, bottom-up approach to phonics instruction of part-to-whole learning, and the analytic, top-down approach to phonics instruction of whole-to-part learning of sight words. (See section 3.3.2 and 3.3.3).
- THRASS is essentially targeted at Foundation Phase learners as a four-year scheme of work (Grade Reception to Grade Three. (See section 3.2.1).
- The programme can be adapted to suit the requirements of learners in any grades or phases. (See section 3.2.2).
- THRASS uses a cross-curricular, integrative approach. (See section 3.2.2).
- The THRASS Phoneme Machine software is specifically designed to support the development of phonemic awareness and phonology in individuals who are deaf or hard-of-hearing. This software programme demonstrates Cued Speech mouth and hand movements in synchronicity with the phonemes that make up spoken words. The raison d'etre is to support speech reading ability by providing visual access to the auditory-based phonology of the spoken word. (See section 3.1).

6.2.1.2 *The research participant*

- Sally was born in December 1997 with apparent normal hearing, to hearing parents
- Sally's family speak Indian English
- Sally contracted pneumococcal meningitis at the age of 20 months
- She was diagnosed with moderately severe to severe sensorineural hearing loss, and digital hearing aids were fitted at the age of 2 years and I month
- Her hearing deteriorated to profound hearing loss and she did not respond to more powerful, digital hearing aids
- Sally learned to lip-read (speech read), but was not taught to sign
- Her first cochlear unit was implanted when she was 4 years and 3 months of age
- At 4 years 5 months she was enrolled in an oral programme – she had no oral expressive language, she could not sign, and she relied on speech reading alone
- At 7 years 3 months the second cochlear unit was fitted, but her cochlea had calcified so only a short electrode could be fitted
- Sally learned spoken language by using her speech reading ability together with residual hearing augmented by bilateral cochlear implants
- Sally attends an Independent School which embraces inclusive education philosophy. Groups are small and collaborate co-teaching strategies are used.

6.2.1.3 *Summary of findings*

The below-mentioned findings may offer guidelines for teaching literacy skills to learners who are deaf; who use the spoken language approach; or who have a similar background to the research participant. These findings also offer guidelines for the implementation of the THRASS programme with learners who are deaf or hard-of-hearing.

One of the themes to emerge from the data was the consistent pattern of speech sound production errors (articulation and phonology) that came to the fore during all phases of the research undertaking. According to the literature the motor-based aspect of speech sound production centres on the physical production of speech sounds in respect of the correct movements of the movable and immovable articulators and this is known as articulation. The linguistic rule-based aspect of speech sound production refers to mastering the rules used to govern the sounds, and this is known as phonology. Errors of structurally-based articulation may not necessarily spill over into reading, spelling and writing, but phonological disorder will have an effect on higher order literacy skills because this disorder is underpinned by a problem in the ability to organise the sound (phoneme) system. (See section 2.6.4 for a discussion on speech sound production). The majority of children learn the phonological system through the sense of

hearing. Thus, it is logical to assume that a learner who is deaf will present with deficits in speech sound production. Additionally, listening (speech reception) and speaking (speech production) skills underpin the development of the language dimensions of form (phonology, morphology and syntax), semantics and pragmatics – skills which are pivotal for the development of higher cognitive skills of reading and writing. Therefore, age of onset, and type and degree of hearing loss are crucial factors in determining the effects the hearing loss may have on phonology and language development.

The findings revealed that the research participant, Sally, lost her sense of hearing at the age of 20 months, a critical stage of language acquisition. According to Yule (1996) Sally would have been in the two-word, linguistic stage of language development with a vocabulary of about 50 words. (See section 2.6.3 for a discussion on phases of first language acquisition). After this stage there is a rapid development in vocabulary, phonology, morphology, syntax, semantics and pragmatics. By the age of five, children communicate much in the same way as adults. Looking back at the summary of the research participant, it may be concluded that Sally was essentially language deprived for an extended period of time from an environmental, cognitive and socio-cultural perspective; the time during which listening and speaking skills, as precursors for the acquisition of all the dimensions of language, would have developed. Historical evidence has indicated that Sally has presented with a speech motor planning problem. Additionally it may be concluded that Sally also presents with a phonological disorder in terms of cognitive-linguistic aspects because the consistent errors of speech production that were noted throughout the research undertaking were also evidenced in her reading, spelling and written work. (See section 2.6.4 for a discussion on speech sound production).

A review of the literature undertaken in respect of the audiogram of speech sounds with the consonant and vowel placements in the speech banana indicated that most of the voiceless consonants and some of the voiced consonants are composed of high frequency energies in terms of pitch, but are weak in intensity or loudness, falling in the range of approximately 20-30dB. (See section 2.2.3 for a discussion on degrees or levels of hearing loss). Consonants are higher-pitched, and hearing loss tends to be greater on the higher frequencies. Meningitis tends to manifest in ossification of the cochlea resulting in the inability to fully insert the electrode wire into the damaged cochlea. This results in a loss of sound on the higher frequencies because the outer spiral of the cochlea respond to lower frequencies and, as the cochlea coils inwards, it responds to increasingly higher frequencies. Since consonants convey most of the word information, act as breaking points, separate syllables and are spoken more softly in terms of intensity, the loss of hearing on higher frequencies will have a detrimental effect on speech reception and comprehension. This reduction in speech reception will have a negative rippling

effect on speech production ability. (See sections 2.2.2 and 2.2.6.2 for a discussion on classification and aetiologies of hearing loss, and cochlear implants).

The research findings indicated that in an aided condition with bilateral cochlear implants, Sally has a mild to moderate hearing loss in the range of approximately 30-45 dB, and most of the consonants that Sally consistently battled with during the research study in respect of articulation and phonology fall outside or are on the border of this range. This affects the audibility and intelligibility or clarity of speech sounds and she would have to rely more extensively on speech reading ability and other visual cues such as Cued Speech to disambiguate phonemes. Any loss of speech signal manifests in delays of speech production, syntax and lexical knowledge, and these delays have been reflected in Sally's reading and writing skills. (See section 2.2.5 for a discussion on implications of hearing loss).

Various authors have stated that children tend to acquire knowledge of phonemes in an explicit order with the plosives or stops and nasals developing between the ages of two and four, and the consonant fricatives and semi-vowels between the ages of four and seven. (See section 2.6.4.2 for a discussion on articulation and phonology in speech sound production). Reflecting back on the summary of the research participant it is evident that Sally's ability to acquire knowledge of specific phonemes was severely compromised during those formative years, and it is the very same phonemes specified by the authors that have formed the consistent pattern of errors noted in the study.

Findings from the literature draw attention to the role played by cultural transmission in language acquisition. (See section 2.6.4.1 for a discussion on speech sound production). There are a number of distinctive features regarding the pronunciation of consonants in Indian English and the 'errors' noted in articulation and phonology or speech sound production may be due to dialect differences.

Findings from the research study show that Sally's mother, who played a pivotal role in Sally's rehabilitation, pronounced a number of consonants in a way distinctive of Indian dialect. Some of the consistent pattern of errors noted in respect of speech sound production during the study mirrored those distinctive pronunciations. However, those same patterns of dialectical differences were reflected in reading and writing indicating the strong reciprocal relationship between spoken language and the language of print, with pronunciation differences in speech sound production metastasizing over into print literacy.

In the discourse on reading (see section 2.6.6 for a discussion on reading acquisition), the experts in the field have highlighted the following:

- Reading is underpinned by knowledge of phonology, morphology, syntax, semantics and pragmatics
- Two distinct components are involved in the reading process: word recognition (sight words) and analysis (decoding), and comprehension (underpinned by lexical knowledge)
- Phoneme-grapheme correspondence is a pre-requisite skill to build phonemic awareness and word analysis skills
- Decoding skills involve phoneme analysis and structural analysis
- Phoneme analysis involves whole-to-part word decoding (top-down approach to phonics instruction) and part-to-whole word synthesizing or encoding (bottom-up approach to phonics instruction)
- Structural analysis involves 'chunking' words into syllables
- The interactive reading approach incorporates bottom-up teaching rooted in developing sound-symbol relationships, and top-down teaching of whole word recognition and analysis
- Eckwall and Shanker's reading framework emphasises the reading components of word recognition and analysis, and comprehension; with the development of phoneme-grapheme association and phonemic awareness as pre-requisite reading skills. (See section 2.6.6.2 for a discussion on the components of reading).
- Chall's Stage Theory interactive model hypothesizes a hierarchy of development of reading skills starting with spoken language and phonemic awareness; then progressing to phoneme-grapheme correspondence by explicit phonics instruction; lexical knowledge; text comprehension and higher order thinking skills. (See section 2.6.6.4 for a discussion on reading acquisition in the deaf and hard-of-hearing).
- The National Reading Panel (2000) identified five critical elements to reading instruction namely, phonemic awareness, phonics skills, fluency, vocabulary and comprehension. (See section 2.6.6.4).
- There are conflicting viewpoints amongst scholars regarding the employment of a phonological, auditory-based approach to reading instruction with learners who are deaf or hard-of-hearing. (See section 2.6.6.4).
- There is on-going debate as to whether deaf and hard-of-hearing students learn to read in much the same way as their hearing counterparts (See section 2.6.6.4).
- The jury is still out on what constitutes best practice in respect of reading approaches and strategies to be used for learners who are deaf or hard-of-hearing (See section 2.6.6.4).

After baseline pre-tests were administered, the research participant interacted with the THRASS programme (see summary above) for a full school year, after which summative, post-tests were administered to evaluate the programme intervention. Below is a summary of the most important

research findings correlated to the reviews in literature where pertinent:

- The majority of reading errors involved the omission of morphemes. Although these errors did decrease in quantity during the intervention period, they were still evident during the Phase Three post-tests. Yule (1996) indicated that during the stage of telegraphic speech (2-3 years) the child starts incorporating bound morphemes such as affixes and inflectional morphemes such as plurals and tenses in speech. (See section 2.6.3.2 for a discussion on telegraphic speech). Sally was essentially language deprived at this stage.
- Substitution errors decreased in frequency as Sally became more aware of phoneme-grapheme correspondence
- Refusals became less prevalent as Sally developed increased confidence and competence with word analysis, synthesis and syllable 'chunking'
- Transpositions decreased in number as Sally developed increased phonemic awareness and structural analysis skills
- Errors involving the analysis and synthesis of vowel diphthongs which are contrasted with two monophthongs vowel sounds together to form two syllables did decrease in intensity during the programme, but these errors were still noted during the post-test phase. According to the literature the English language is orthographically inconsistent, and displays many inconsistencies and irregularities in reading and spelling, particularly in respect of the small phonemic units encountered by synthetic phonics. (See section 3.3.5 for a discussion on synthetic versus analytic phonics approach). Take, for example, the word 'soloist'; the 'oi' could be the diphthong ɔɪ as in 'coin'. The THRASS Phoneme Machine and Cued Speech, together with the IPA symbols and the use of a pronunciation dictionary, played a pivotal role when Sally was faced with words that were phonologically complex or irregular.
- Misreads at the commencement of the programme involved simple words, but misreads at the end of the programme involved complex word structures. This was indicative of increased phonemic awareness and advances in the skills of word analysis, synthesis and syllable chunking. However, Sally sometimes still reverted to using the whole-word gestalt or orthographic approach for word recognition. Marshark (2010) has suggested that the majority of deaf and hard-of-hearing students may rely more on visual orthographic patterns when reading, but some learners do employ both auditory and visual input to develop a phonological code. (See section 2.6.6.4 for a discussion on reading acquisition in deaf and hard-of-hearing children). Through interacting with the THRASS programme, Sally has learned to utilise both modalities
- After a year of interacting with the THRASS programme, which incorporates the Phoneme Machine and Cued Speech, Sally gained 6,7% in the THRASS 120 keyword

reading test; 7,6% in the THRASS 500 sight words test; 1 year 8 months in the Schonell Graded Reading Test, and 2 years 4 months in the Burt Graded Reading Test. Various scholars have pointed out that the average reading grade level gain for the majority of deaf and hard-of-hearing students ranges from 2 to 3 months. Based on an average of the two Graded reading tests, Sally has achieved an average reading grade level gain of 2 full years. This is approximately 87% higher than the expected grade level gain of the majority of deaf and hard-of-hearing individuals. Numerous authors have referred to the fourth-grade plateau phenomenon because deaf and hard-of-hearing students leave High School reading at levels commensurate with the average 8 to 9 year old, fourth-grade hearing student. Sally was reading at an average age of 10 years and 2 months which is over a year above the level expected.

Reading is converting graphemes to phonemes and writing or spelling is converting phonemes to graphemes. The THRASS programme centres on reading and spelling at Word Level Teaching (see THRASS summary above). Baseline spelling pre-tests were administered, the research participant subsequently interacted with the THRASS programme for a full school year, after which summative, post-tests were administered to evaluate the programme intervention. Below is a summary of the most important research findings linked to the reviews in literature where relevant:

- Omissions or deletions, substitutions and insertions were all morpho-syntactically based errors which were also prevalent in reading and speech sound production. Numerous authors have publicised the strong reciprocal relationship between reading and writing because both processes involve letter-sound correspondence; as well as the facilitative relationship between the spoken word and print literacy. Yule (1996) posits that the morpho-syntactic dimensions of language develop from about 18 months to approximately 40 months. Sally's inability to communicate effectively during this time had a pervasive influence on her ability to acquire these language forms (see section 2.6.3 for a discussion on phases of first language acquisition)
- Errors involving vowel diphthongs, which are contrasted with two monophthong vowel sounds together to form two syllables, were noted in spelling as with in reading. This was due to the orthographic inconsistency of English as well as Sally's reliance on the visual modality at times. Various scholars have indicated that deaf and hard-of-hearing children follow distinctive developmental spelling patterns because they rely more on visual information as opposed to auditory information. However, Sally became increasingly skilled at segmenting whole words into parts and then making correct spelling choices when recording the words. It is pertinent to note that Sally made use of *visual* cues such as speech reading and Cued Speech to help her make informed spelling choices – she

relied less on auditory input. The obstacles encountered with audition have triggered the increased reliance on and development of vision

- Transpositioning of letters in words was also prevalent in both spelling and reading. Researchers have indicated that deaf and hard-of-hearing children are often incapable of *phonologically* encoding ordered sequences. This means that they may choose the correct or near correct spelling choices, but they transcribe the chosen phonemes onto paper in the incorrect sequence in the form of anagram-type writing. Sally made these errors consistently
- After a year of interacting with the THRASS programme, and in particular the Phoneme Machine and Cued Speech, Sally gained 17,5% in the THRASS 120 keyword spelling test; 12,8% in the THRASS 500 sight word test, and 9 months in spelling age in the Schonell Graded Spelling Test.
- Sally's spelling age on the graded test was 11 years 8 months compared to her average reading age of 10 years 2 months. Researchers have illustrated that deaf and hard-of-hearing children tend to spell better than they can read because of the visual orthographic nature of spelling

A review of the results obtained in reading and spelling indicate that Sally has made positive gains in both areas. Looping back to the research problem statement regarding the implementation of the THRASS programme, a sub-statement involves investigating the role played by the Phoneme Machine together with the Cued Speech option in supporting the development of these literacy skills. (See sections 3.1 and 3.2 for a discussion on THRASS). The literature review highlighted the following:

- Only about 20-30% of spoken English is visible on the lips, even in dyadic conversations. (See section 2.3.1.2 for a discussion on the Auditory-Oral approach).
- Many speech sounds are difficult to discern on the lips. Cued Speech disambiguates phonics by augmenting speech reading when using the spoken word. (See section 2.3.1.3 for a discussion on Cued Speech).
- Cued Speech facilitates visual access to those phonemes that cannot be discriminated due to high frequency hearing loss; in particular the consonants which carry most of the spoken word information.
- Morpho-syntactic knowledge is difficult to access via speech-reading alone because morphemes are affixed to words, are short, or are unaccented. Therefore they are often not perceived or encoded. However, Cued Speech provides unambiguous information, even of unstressed or unaccented morphemes, thus allowing visual access to morpho-syntactic knowledge. (See section 2.6.3.2 for a discussion on the Linguistic Stage of first language acquisition).

- Early exposure to Cued Speech enhances the development of phonology and phonemic awareness, particularly in children raised in *oralist* environments as Sally is. This will have a run-off effect on higher cognitive-linguistic skills
- Cued Speech is a valuable, visual, supplementary instructional tool for reading instruction
- Cued Speech addresses the orthographic inconsistency of English

The research findings were underscored by the following observations *prior* to Sally interacting with the Phoneme Machine, learning Cued Speech or learning the IPA symbols which represent the 24 consonant and 20 vowel phonemes: (refer back to Chapter Three for a discussion on THRASS).

- At the commencement of the THRASS programme Sally made numerous print literacy errors even with simple three and four-letter words.
- She relied heavily on whole-word recognition (gestalt) and often refused to read unfamiliar words in text because she was very reticent to decode words into sound units (analyse) and then blend (synthesize) words by orthographic mapping of phonemes to graphemes. This led to her misreading many words in isolation and in context.
- Text-based reading aloud was halting because of very limited lexical knowledge and the reticence to analyse and synthesize unfamiliar words. This had a negative spin-off effect on comprehension
- Sally could not discriminate all of the syllables in words when writing words on paper and she was not always successful in her attempts to 'chunk' (segment) whole words into parts by structural analysis because she did not know the rules of syllabification.
- Sally presented with a pervasive problem in respect of morpho-syntactic knowledge.
- She also displayed very limited knowledge of the phonemes and graphemes which represent long vowel monophthongs or vowel digraphs, and diphthongs
- Sally's reading average gleaned from the Schonell and Burt graded reading pre-tests realised a reading age of 8 years 2 months which put her on the lower cusp of the fourth-grade reading plateau experienced by the majority of deaf and hard-of-hearing students

The following observational findings were noted after Sally had interacted with the software programme for a year:

- Sally made relatively few errors in reading and spelling simple three and four-letter words
- Although Sally still tended to revert back to the Gestaltist approach to whole-word recognition at times, she seldom refused to read an unfamiliar word. She was confident in her ability to decode and encode words which were outside of her lexical framework. This resulted in her misreading far fewer words. She mostly used a combination of whole-word recognition, phonological and orthographical recoding when reading.

- Sally's enhanced ability to analyse and synthesise words may be illustrated in the graded reading tests. Initially Sally read 39 words and 43 words in the Schonell and Burt tests respectively. At the end of the programme she read 61 words and 68 words respectively. Noteworthy is the fact that, at the end of the intervention, Sally completed the entire Schonell reading test without making ten consecutive errors. Initially she spelt 59 words correctly in the graded Schonell spelling test, and finally she spelt 67 words correctly.
- Sally's reading average derived from the Schonell and Burt graded reading post-tests realised a reading age of 10 years 2 months which put her over a year higher and above the reading plateau of the average 18 or 19 year-old deaf or hard-of-hearing school leaver.
- Text-based reading became more fluent because of Sally's increased ability to analyse whole words into parts and then blend of synthesize the parts to wholes
- Sally knew how to structurally analyse most unfamiliar words into syllables or chunks when reading and writing and she used re-auditorisation and re-visualisation techniques
- The more Sally interacted with the Phoneme Machine software the more adept she became at using the pronunciation dictionary together with the IPA symbols and Cued Speech to read increasingly challenging and complex print. This resulted in quantitatively increased vocabulary knowledge and this had a rippling effect on her ability to comprehend literal text. However, Sally still battled to draw inferences from texts because of her limitations with metacognitive strategies. (See section 2.6.5.1for a discussion on Metacognition). According to the literature review, this is prevalent in deaf and hard-of-hearing learners. They are also restricted in both their lexical knowledge as well as their ability to readily acquire lexical knowledge, and this has ramifications for text-based comprehension.
- Although there were still a number of errors relating to reading and spelling involving vowel digraphs and diphthongs, these errors were quantitatively reduced
- Errors of morphosyntax were somewhat reduced, but still evident in reading, spelling and writing. Research has revealed that deaf and hard-of-hearing students acquire metalinguistic knowledge at a slower rate during the adolescent years, and Sally is an adolescent. (See sections 2.6.4.1 and 2.6.5.2 for a discussion on Metacognition and Metalinguistics)
- The Cued Speech assessments (see Table 5.1 and section 5.3.1.4 for a discussion on Cued Speech) underscored the pivotal role played by Cued Speech in synchronicity with speech reading as opposed to speech reading alone, augmented by residual hearing with the aid of cochlear implants

Themes that have emerged from the literature review and the research findings have been unified in an attempt to provide a nexus to the research problem statement which is titled ‘’Implementing the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme with an Intermediate Phase deaf Gauteng learner using the spoken language approach’’. It is pertinent to briefly review the efficacy of this programme, which has been the phenomenon under study in this research undertaking, and what can be deduced from the work as a whole.

6.3 THE UTILITY OF THE THRASS PROGRAMME FOR DEAF AND HARD-OF-HEARING LEARNERS

> The bridge between research and practice is still a fragile one, but I think it has made some progress over the past 10 years. [However,] there are few ‘’right’’ answers in this field, and what is ‘’right’’ for one child may be wrong for another (Marschark 2009xii-:xiii).

An aspect that may need to be given due consideration is that Sally was reading at a level commensurate with a learner in Grade Two or Three in South Africa (8 years 2 months). Reflecting back on Ekwall and Shanker’s reading framework (see sections 2.6.6.1 and 2.6.6.2 for a discussion on reading acquisition) Level 1 phonemic awareness and phonics and Level 2 word recognition and analysis and both of these levels need to be mastered to some extent in order to progress to Level 3 reading and study skill requirements of the Intermediate Phase. Chall’s Stage Theory also posits that phonemic awareness, phonics and recoding skills in Stages 0-2 are pre-requisite skills for Stage 3 reading to learn in Phase A, Intermediate Phase. According to various scholars deaf and hard-of-hearing students reach their reading ceiling before Level 3 or Stage 3 Phase A because they have not acquired the pre-requisite skills for reading in the levels or stages. Sally, an Intermediate Phase learner in Grade Six at the time this intervention took place, was thus still in the *learning to read* phase. However, at the culmination of the THRASS intervention programme, Sally was reading at a level commensurate with a Grade Four or Five learner in South Africa (10 years 2 months). This places her in the *reading to learn* phase which is above the ceiling generally experienced by 18-19 year-old deaf and hard-of-hearing High School leavers. (See section 2.6.6.4 for a discussion on reading acquisition in deaf and hard-of-hearing children).

It is pertinent to consider that the school year equates to approximately 180 days which may be reduced to about 36 weeks or 9 months. Sally thus gained two years in reading proficiency over approximately nine months. It may thus be stated with confidence that the THRASS programme has proven to be effective in enhancing the literacy skills of the research participant, Sally, because the results of achievement in the post-tests were statistically significant.

The Phoneme Machine, together with the Cued Speech option and the IPA symbols, has played a pivotal role in providing visual access to auditory-based phonological codes by augmenting speech reading and disambiguating phonics when using the spoken language approach. As a learner who is profoundly deaf, and who uses the spoken language method of communication, Sally has been able to learn Cued Speech as a visual tool to augment her ability to speech read, with the aid of residual hearing and bilateral cochlear implants. This has allowed her to gain access to and utilise her knowledge of phonemes, which are the building blocks of spoken language, to facilitate her advancement in the skills of print literacy.

The THRASS programme has supported the development of phonemic awareness and phonics at word level by facilitating the acquisition of the critical pre-reading skill of phoneme-grapheme correspondence which underpins the Alphabetic Principle. There is a strong circular causality as well as hierarchical and interactive progression among phonology, morphology, syntax, semantics and pragmatics in terms of spoken language acquisition and the higher cognitive skills of reading and writing. Although the cross-curricular, integrative and adaptive approach of the THRASS programme has supported the development of all of the dimensions of language, Sally's loss of hearing during the language formative years has had a profoundly ubiquitous effect on her overall literacy development.

It would be quixotic to assume that the THRASS programme is the panacea for developing print literacy in *all* deaf and hard-of-hearing individuals, because each individual brings to the educational event a unique set of circumstances. There is a significant level of diversity in deaf and hard-of-hearing individuals in terms of a myriad of factors including age of onset of deafness, type of deafness, degree or level of hearing loss, biological and intellectual constraints, methods of communication, socio-cultural milieu, organicity, co-morbid learning disabilities, age of intervention and type of intervention. Each child will also have a unique set of strengths, weaknesses and educational needs that will influence the outcomes of any intervention programme. Therefore, one cannot assume that any particular programme, intervention, system or approach will be the optimal answer for ameliorating the literacy challenges of all deaf or hard-of-hearing individuals. Marschark (2006:5) declares that ''it is time to acknowledge that we may have made relatively little progress in advancing deaf students' reading and writing skills, despite decades of trying with a new 'strategy du jour'''. In the current zeitgeist there seems to be more questions than answers, illustrating that the need to investigate the efficacy of programmes, systems and approaches is de rigueur. The THRASS programme is only one cog in the wheel to potential literacy development, and any programme is only as effective as the people implementing it.

RECOMMENDATIONS

Marschark (2009:234) emphasises that ''deaf children are not hearing children who cannot hear, but *differences* should not be equated with *deficiencies*''. Deaf children are the same as their hearing counterparts in terms of potential, but different in terms of how they should be accommodated in educational settings so that they too may achieve their potential. This is of particular significance since many deaf and hard-of-hearing individuals are being accommodated in inclusive educational settings, yet they may require different educational experiences from their hearing peers.

There are a number of strategies that may be utilised in the *educational* situation in order to afford deaf and hard-of-hearing (DHH) learners' equal access to education as it happens in an inclusive school setting. The following are strategies that may be employed in order to offer the best possible support to DHH learners in the Least Restrictive Environment. These methods may be applicable to the implementation of THRASS in order to scaffold the literacy development of DHH learners in the classroom - bearing in mind that the spoken language approach is the method of communication – or they may be applicable to the general classroom setting as well.

- It is recommended that the teacher researches the background of each DHH learner in an inclusive setting, remembering that each learner will bring to the teaching-learning event a unique set of circumstances surrounding his or her deafness. In order to gauge the level of conceptual understanding in respect of language, the teacher should be aware of the type and degree of hearing loss; the classification and aetiology of the hearing loss; the age of onset (this is paramount in respect of language acquisition); whether the deafness is unilateral, bilateral, symmetrical or asymmetrical; what type of assistive devices are worn; how these devices function and how to monitor them; whether the learner has intelligible speech; the level of the learner's speech reading skills; the cultural background of the learner; whether the parents are deaf or hearing; whether any form of natural or hybrid sign has been learned; the level at which the learner is functioning in respect of language acquisition, and so on. There are a myriad of questions that may be asked in order to build up a profile of a DHH learner and become deaf aware. Deafness has a ubiquitous influence on the acquisition of language, and this has an exponentially negative effect on the higher skills of print literacy. The age of onset is a critical factor in respect of language acquisition, and early intervention is pivotal
- The THRASS programme is essentially a phonographic programme developed for the Foundation Phase learners in the range Grade Reception to Grade Three. Bearing in mind that DHH Grade Reception learners may be approximately 5 years of age, it is advised that the educator has background knowledge of the learner as discussed above.

The raison d'etre is because, according to scholarly viewpoints, the average 5 year-old has acquired language much like that of an adult. Depending on whether DHH learners suffered hearing loss prelingually or postlingually, this could have a deleterious effect on their ability to develop phonological awareness. These learners may have lost that 'window of opportunity' to acquire the phonological, morphological, syntactical, semantic and pragmatic dimensions of language

- It is suggested that teachers place heavy emphasis on *listening* and *speaking* skills during THRASS lessons which involve developing phonological and phonemic awareness because these skills are elemental to successful first language acquisition and the language dimensions of form, semantics and pragmatics. Teachers should be aware that the spoken language approach applies emphasis to 'listening' and speaking through the vehicle of speech reading, with the aid of residual hearing augmented by amplification technology. The bedrock of this approach is to develop the skill of audition rather than visual-gestural language
- In order for DHH learners to gain the maximum benefit during the THRASS intervention programme it is advised that staff members are trained and informed in respect of the implementation of this programme. The THRASS programme has been shown to have the potential to provide DHH learners access to the auditory-based phonology of the English language, and thus develop their ability to analyse and synthesize words. This has a spin-off effect in developing print literacy skills from Word Level through Sentence Level to Text Level so that learning to read is scaffolded to reading to learn
- It is recommended that educators have a sound understanding of the role that phonology plays in developing literacy skills, not only in learners who are DHH, but with their hearing counterparts as well. DDH learners can be taught to make use of a phonological code to develop their reading and writing skills. Phonological awareness, phonemic awareness and phonics are the key elements on which THRASS is based, and these elements are pre-requisite skills to print literacy. A sound knowledge of the Alphabetic Principle will stand these learners in good stead
- It is recommended that educators attend courses in Cued Speech so that they can teach DDH learners who use the spoken language approach, and even their hearing counterparts, how to cue. If teachers can cue, they can adjust the pace at which Cued Speech is taught when using the THRASS Picturechart of keywords. When using the Phoneme Machine with the Cued Speech option, the teacher can demonstrate the cueing of the keywords and the 500 base words. This will add value to the utility of the Phoneme Machine Cued Speech option together with the video clips of the Cued Speech transliterator. A foundational course in Cued Speech can be learnt over two days. When Cued Speech is used in synchronicity with speech reading to disambiguate the

phonemes in words, it has the potential to make a profound and positive impact on the ability of DHH learners to gain visual access to the phonology of the English language

- It is suggested that the International Phonetic Alphabet (IPA) symbols be taught to learners. This will ensure that they are able to use pronunciation dictionaries because these IPA symbols are visual representations of phonemes and their corresponding graphemes. In other words these visual symbols augment their ability to 'hear' each word with the correct pronunciation. It must be emphasised that English is orthographically inconsistent, irregular and complex
- The use of a pronunciation dictionary is highly recommended for supporting the development of lexical knowledge in DHH learners. It must be born in mind that these learners have very limited life-world experiences and they are essentially language – deprived. There is a strong correlation between vocabulary knowledge, concept formation and comprehension of text
- It is suggested that educators gain background knowledge of language acquisition and the views of different theorists in respect of how children acquire language and, in particular, how DHH children acquire language in contrast to their hearing counterparts. The views of Skinner, Chomsky, Piaget, Bandura, Yule and Vygotsky, for example, may be read in terms of the theoretical frameworks which underpin these differing viewpoints. This knowledge is valuable when planning strategies to support DHH learners. If educators understand how children, and specifically DDH children acquire language, they may be better equipped in deciding how to help them and how to tap into their innate potential
- Additionally, knowledge of the approaches (bottom-up, top-down, interactive) to reading acquisition and the models which illustrate reading acquisition is indispensable. The higher cognitive skills of print literacy form part of a hierarchy of skills, and unless the requisite components have been firmly grasped, the foundations for effective learning will be compromised. The report by the National Reading Panel, the reading framework of Ekwall and Shanker, and Chall's Stage Model theory bear reference
- It is highly recommended that pre-tests are administered to DHH learners - as well as their hearing counterparts - before embarking on the implementation of the THRASS programme. Initial testing is *testing for teaching* and this means that the knowledge gained from the observation during testing, and the analysis of errors after the testing process, serve to inform future teaching strategies. Administering annual post-tests are also used for error analysis and serve the purpose of *testing of teaching* in order to inform further teaching strategies
- The analysis of errors in respect of articulation and phonology (speech sound production), reading and spelling (writing) is suggested so that educators may be guided

in the choice of strategies to use to scaffold each DDH learner from his or her unique zone of proximal development (ZPD). The pattern of errors that present during testing and teaching may be used to adjust and adapt the THRASS programme according to the skills that need to be developed in the learners

- It is recommended that teachers look for consistent patterns of articulation and phonological (speech sound production) errors, and note whether these same errors are also evident in reading and writing. The THRASS resources may then be utilised to address these errors
- It is advised that educators be informed with regard to cultural dialectic differences because these differences may be noted during the administration of tests, during articulation of the spoken word, and even in reading and writing. These differences should not be equated as errors
- The THRASS programme is very flexible in respect of how the various Phases and Stages are introduced, and the pre-tests may be used by the educator to decide on how to initiate the programme and which parts of the programme to spend less or more time on. This is particularly relevant when starting the THRASS programme with older DHH learners. Assessing what these learners *do* know helps the educator decide on how to implement the programme so that the learners may be taught what they *don't* know. Educators should be aware that adolescent DHH learners tend to develop writing skills at a reduced rate

- During the roll-out of the THRASS programme it is highly recommended that observational notes are recorded regularly and meticulously because these observational notes may be used to analyse errors, inform future teaching and allow for teacher reflection
- It is suggested that teachers go through the songs and the lessons pro-actively with DHH learners if possible. These learners will only know vocabulary, terms, concepts and words that they have used frequently; so these learners may not have experienced some of words, terms or concepts before. They have the potential to learn, albeit not always the experience of prior learning
- When teaching phonology, phonemic awareness and phonics – elements that underpin the THRASS programme – it is advised that the audibility and intelligibility or clarity of sounds at different frequencies on the speech banana is kept in mind. It is suggested that particular attention is paid to the consonants because they present on higher frequencies, are softer in pitch, but carry the syllable structures and messages in most words
- It is recommended that the DHH learners' written work be analysed carefully in order to

gauge their level of morphosyntactic competency. Their reading ability and their written work will be a reflection of their spoken language ability and will often highlight levels of ability and understanding. There is a strong reciprocal relationship between spoken and written language and oral competency precedes print literacy

- Teachers should remember that not only do DHH learners need face-to-face contact in order to speech reading successfully, but they also need to look at the board or the (THRASS) chart to see your explanations, and they need to look at their books, notes or (THRASS) desk charts simultaneously. Learn how to accommodate this reference triangle and be aware of the burden placed on their visual modality. Employing the skills of speech reading, residual hearing, taking notes, reading charts, cueing and trying to process concepts – all simultaneously – is exhausting and very taxing on the brain. Learners may go into sensory overload and just 'switch off' from the environment
- It is advisable to teach the rules of syllabification so that, after segmenting words into individual phonemes, learners can 'chunk' the words into syllables – DHH learners tend to prefer this method as it is more visually based
- It is suggested that colour-coding is used when teaching learners how to break words into syllables. They can then be taught to take visual 'snapshots' of the 'chunks' and re-visualise these when spelling words.
- Teachers should be aware of the need to speak clearly and at a natural rate because if speech is overemphasised it distorts lip patterns, making speech reading difficult
- It is advised that educators do not talk or discuss any concepts whilst listening to or singing the THRASS songs or Raps and Sequences. It is suggested that if the need to comment on phonemes or words arises, it is best to stop the music first, wait for silence, and then impart any information
- It is recommended that use be made of collaborative co-teaching strategies if possible; especially in an inclusive setting. It must be borne in mind that only 20-30% of conversation is accessed via speech reading, even in dyadic conversations, with the result that DHH learners may lose much essential information when sitting in a group or class. It is suggested that face-to-face, individual support is given whenever possible during team teaching efforts
- Teachers should ensure that the learning and listening environment is optimal and that background noise is reduced, because incidental noise causes confusion
- It is suggested that educators run a daily check to ascertain that amplification technology is in good working order before the commencement of lessons
- DDH learners need to be strategically placed in the group or classroom to allow the best possible access to spoken language and communication. Bearing this in mind it is recommended that DDH learner be seated near the front of the classroom and slightly to

one side so that they get a clear view in order to speech read the words of the teacher and of their peers - DHH learners will rely on cues from their peers if they have not understood the teacher correctly. It is suggested that the teacher takes cognisance of the degrees of hearing loss in each ear of these learners when seating them, particularly if the hearing loss is asymmetrical. Teachers should use eye contact and speak clearly and directly to DHH learners in the inclusive classroom

- Teachers should ensure that DHH learners are paying attention before giving instructions and before changing topics
- In general, DHH learners present with a vast array of gaps in their knowledge and awareness of language. Before giving any particular lesson in any subject area it is recommended that teachers work pro-actively with these children by reading and discussing the notes, worksheets or sections from the textbooks
- It is necessary that staff members be trained and informed so that they become '*deaf aware'* in order to include DHH successfully in an inclusive setting. This means that all adults and learners who come into contact with DHH learners within the school environment should have a good understanding of deafness
- Finally, it is suggested that educators and parents work together as a team in order to afford each DHH learner the best possible support. Read to and with these learners as much as possible, both in the classroom and at home, in order to expand their life-world knowledge and enrich their vocabulary

6.4 LIMITATIONS

Any research undertaking will present with both strengths and weaknesses or limitations which originate from the theoretical and methodological framework. This study has been underpinned by an Interpretivist paradigm, and although it may be deemed to have embraced a mixed-methods design approach, the primary method has been qualitative in nature. The possible limitations to this particular research study are deliberated on below:

- The THRASS programme is essentially designed as a four- year scheme of work for the Foundation Phase (Grade Reception to Grade Three inclusive), although the programme may be adapted to suit the requirements of learners in any grades or phases. This scheme of work was implemented over one school year. In order to gain a more in-depth evaluation of the programme, which is the phenomenon under study in this research undertaking, consideration needs to be given to the fact that exposure to the programme – with the inclusion of Cued Speech - over a four-year period may have yielded different results. However, the research participant was in the Intermediate Phase and entered the study equipped with prior knowledge in terms of reading, spelling, writing and handwriting, thus the programme could be adapted to suit her needs.
- The THRASS programme originated in the United Kingdom and no research has been undertaken in South Africa in respect of the applicability of the programme for deaf and hard-of-hearing children. The children may be unfamiliar with some of the key words on the charts, and the sounds produced by the moving lips in the Phoneme Machine software program are distinctly 'British'. This has possibly placed a limitation on the research participant in the study because speech reading of the moving lips and the sounds heard by residual hearing did not always seem congruent. However, this did afford the learner the opportunity to learn about different cultural dialects or variations of how people from different regions pronounce English phonemes and words. It may be suggested that adjustments could be made to the Phoneme Machine software programme to include more typically sounding South African English in terms of accent. However, South Africa is a richly diverse, rainbow nation and what sounds right to one individual may not sound right to another.
- This study has been limited to one research participant with unique circumstances and the findings are, therefore, exclusive. Thus, this study may be considered small-scale and lacking in rigour. This is a delimitation of this study in that it has been situated in a specific context within a bounded system and cannot be generalisable to other people in similar settings or to the larger population. However, this research has allowed for the in-depth study; rigorous and vivid description; evaluation of a specific, complex phenomenon or bounded system, and how one participant has interacted with an

individual *case* in order to provide unique case information and an accurate presentation of the phenomenon under study. Although not generalisable, the knowledge gained from this study is transferable because the insight gained from the study may be useful for other settings.

- The findings of this study are both delimited and limited to one deaf Intermediate Phase learner. However, other educators of deaf and hard-of-hearing children in any of the phases of education could benefit from the information derived from this study.
- The launch and landing of this research undertaking involved quantitative pre-tests and post-tests. Any test situation may illicit emotional constraints in any individual. However, the research participant has been attending the school where the study took place and is familiar with the setting, the researcher and the educator. Therefore, any possibility of performance anxiety may be minimal.
- Although the norm-referenced tests administered as pre-tests and post-tests are still used extensively in South Africa, the tests are outdated and are benchmarked from a broader *hearing* population. Thus, these tests may not be deemed to be culture fair. However, the same tests were used in Phase One and Phase Three of this study, therefore, the same benchmark was used in both situations. Additionally, a full year had passed between the administrations of the tests so the participant could not have become test familiar.
- The researcher is the key instrument in qualitative research, assigning meaning to a complex interaction of factors through the Interpretivist lens. The researcher uses inductive and deductive logic and reasoning to evaluate emerging patterns and find out, ''what has been going on here?'' In this research study, I, as researcher worked closely with the research participant. However, collaborative, co-teaching afforded the opportunity for member cross-checking and reflexivity in order to minimise any potential risk of results being influenced by the researcher's personal biases, bearing in mind that each person constructs a unique image of reality based on individual preferences and prejudices when interacting in a social context.

6.5 FUTURE RESEARCH

It would be idealistic to assume that any one research undertaking involving the evaluation of an intervention programme could provide the ultimate answer in ameliorating the literacy deficit faced by the majority of deaf and hard-of-hearing children. However, any research undertaking should make a useful contribution to existing knowledge, advance our understanding, and lead to the formulation of new questions linked to the topic; opening the doors for related research and inspiring future research. There is a dearth of research based on the THRASS programme within the South African context.

As previously mentioned, the THRASS programme has been designed as a four-year scheme of work for the Foundation Phase (Grade Reception to Grade Three inclusive). It is suggested that this programme be implemented over a four-year period as a longitudinal study with a group, a class or a school of deaf and hard-of-hearing children who use the spoken language approach. This could be conducted in any or each of the phases in education in order to provide a comprehensive, holistic evaluation of the efficacy of employing a phonological, auditory-based literacy programme - supplemented by the visual access facilitated by Cued Speech - with learners who are deaf or hard-of-hearing. It is also suggested that as THRASS advocates a whole-school approach, a longitudinal study may even be carried out in a similar vein at a School for the Deaf that may use the sign language approach.

Different norm-referenced tests may be used to inform both pre-test and post-test results for the launch and landing of any short-term or longitudinal studies involving the THRASS programme.. For example, The Neale Analysis of Reading Ability (NARA), the Test of Phonological Awareness Skills (TOPAS), the Pre-reading Inventory of Phonological Awareness (PIPA), Phonics-Based Reading Test (PRT), Test of Oral Reading and Comprehension Skills (TORCS) to name a few (Trezek et al 2010:84-85). Although there are relatively few reading tests specifically normed for deaf or hard-of-hearing children, an example of one such test is the Test of Early Reading Ability for Deaf and Hard-of-Hearing which is specifically designed for children with moderate to severe sensorineural hearing loss (Academic Communication Associates 2013).

Short-term or longitudinal studies may also be carried out with two groups of deaf and hard-of-hearing children; one group using the THRASS phonographics programme at word level and incorporating Cued Speech and another group using a different programme that is also pitted at word level phonographics, but incorporates Visual Phonics as an instructional tool.

It may be stated with confidence that the THRASS Phoneme Machine software which incorporates the Cued Speech option and the IPA symbols has been a key component in scaffolding the literacy development of the research participant who is deaf. However further longitudinal research studies could investigate the utility of the THRASS programme, focusing specifically on the utility of the Phoneme Machine software, together with Cued Speech and IPA symbols, on hearing children diagnosed with reading disorder, previously known as dyslexia.

6.6 CONCLUSION

This research undertaking was rooted in exploring the implementation of the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme to determine the extent to which this programme – which incorporates the use of a Phoneme Machine together with a Cued Speech option – may enhance the literacy levels of an Intermediate Phase learner who is deaf and who uses the spoken language approach. This programme has been the case or the phenomenon under study in this research endeavour.

Regarding the reading development of deaf and hard-of-hearing learners it has been stated that these learners are qualitatively similar, but quantitatively different in terms of phonological awareness development. To address this difference, the THRASS programme has incorporated Cued Speech as an instructional tool to facilitate visual access to auditory-based phonology. Cued speech has been used in synchronicity with the additional visual tool of speech reading, in the Phoneme Machine to enhance this access. Phonological awareness is the pre-cursor to phonemic awareness and phonics; and the direct, explicit instruction of phonics at Word Level has developed the research participant's knowledge of the Alphabet Principle which concerns phoneme-grapheme correspondence.

The THRASS programme has been instrumental in developing both word analysis and word recognition skills and this has increased the research participant's level of automaticity, and expedited her reading fluency. The improved ability to analyse, synthesize and recognise words in increasingly complex texts has augmented lexical knowledge and this has played a contributory role in enhancing reading comprehension.

Although these areas still remain a challenge, the research participant's ability to read and comprehend more advanced texts with more confidence, may scaffold the development of more sound knowledge of the morphology, syntax, semantics and pragmatics of the English language. This may ultimately support her development in metacognition and metalinguistics; skills required for higher order cognitive learning and which are increasingly important as a learner moves through the Senior and FET Phases.

It may be stated with confidence that by 'implementing the Teaching Handwriting, Reading and Spelling Skills programme with an Intermediate Phase deaf Gauteng learner using the spoken language approach', positive yields have been generated in respect over her overall literacy development.

In closing, Paul (2009:xvi) explicates the following:

> To acquire a first language, deaf and hard of hearing children need to be exposed to a fluent, intelligible, complete communication system…. There seems to be growing evidence that the litmus test for any language/communication system is how well it represents the phonology of a language, because phonology is considered the building block. In addition, deaf and hard of hearing students need to acquire an understanding of the other language components such as morphology, syntax, semantics and pragmatics. Nevertheless, the internalization of the rules of the other components might be facilitated by access to the fundamental building block of phonology. This is true for all languages, whether phonology is based on sound mechanisms, as is the case for English, or on visual-gestural mechanisms, as is the case for American Sign Language.

As a life-long learner and an educator of children with barriers to learning, I would like to close off this dissertation with the following prose written by Bob Standish (1988:83).

When you are with children
for a long, long time,
it is like hearing the seeds and buds growing
or
seeing the creation of a snowflake design before
it becomes a portion of a greater landscape.

I cannot expect you to hear what I hear or see what I
see
or to share in the wonderment of it all.

But that's O.K.

I just wanted you to know there's a reason
why I'm here.

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Appendix A: Consent form for research participant

Parental consent letter

To the parents of ……..

Mr and Mrs ……

RE: Proposed Research Undertaking

I, Vivien Mumford, learner support specialist at ……. where your daughter, ……., is currently enrolled, respectfully request your permission to involve …… as a single research participant in the research study that I will be undertaking at the College.

The purpose of the intended research is to investigate the efficacy of utilising the Teaching Handwriting, Reading and Spelling Skills (THRASS) programme with a learner who is deaf and who uses the spoken language approach to communication. Thus, the objective is to explore whether the aforementioned programme - which utilises a Phoneme Machine incorporating a Cued Speech option – is able to scaffold the literacy development of a learner who is deaf. The proposed title for the research undertaking is ''Implementing the Teaching Handwriting, Reading and Spelling Skills programme with an Intermediate Phase deaf Gauteng learner using the spoken language approach''.

Your daughter has inspired me to continue my studies so that I may be empowered with the knowledge of how best to accommodate learners who are deaf, particularly in respect of their language acquisition. The reciprocation is that …….. will be given extensive additional support to scaffold her overall literacy development and this will stand her in good stead as she moves through the various phases in education.

I am fully aware that …… has been in an environment where she has been encouraged to use only spoken language together with lip reading, supported by residual hearing with the aid of amplification technology, as the preferred mode of communication. I understand that you, as the hearing parents of a child who was born hearing but became deaf due to unfortunate circumstances, have been opposed to any form of signing. However, rest assured that the Cued Speech option in the Phoneme Machine software of the THRASS programme is not a signing system.

Cued Speech, per se, is *not* a natural signing system used by the Deaf; neither is it a manually coded system. It is an artificial system developed as an aid to improve the reading abilities of children who are deaf by helping them discriminate the sounds that look identical on the lips. Thus, it is a system that *supports* lip reading because sounds such as *p* and *b* will be shown with different hand shapes to give a visual clue in order to disambiguate the spoken sounds in words such as in, for example, *pat* and *bat.*

All information gathered during the year-long intervention programme will remain confidential and your child's identity, the family's identity and that of the school will remain anonymous – pseudonyms will be used in the research report. Additionally, your child's participation in this research study is purely voluntary and, should she wish to withdraw during the course of the research, she may do so. I will endeavour to ensure that no physical, emotional of mental harm comes to her, and that she does not experience any form of discomfort during the intervention programme.

Thank you for affording me the privilege of working with your child.

Consent and Confidentiality – Parental consent letter.

PART A: Letter of Consent

I …… parent of …… who is currently enrolled at…….. College, have consented to my child participating in Vivien Mumford's Master of Inclusive Education studies. I am aware that any data collected and analysed in respect of the research will be used in the Master's Research Dissertation which will be submitted to the Education Department at the University of South Africa. I understand that my family's identity, my daughter's identity and all identifying information of the school will be kept strictly confidential and will remain anonymous during the actual research process as well as in the final research dissertation.

I understand that the information gathered in the research process may be used for further research purposes, presented anonymously at professional meetings and/or published in journals or textbooks. I further understand that all teaching and assessment sessions will be recorded.

By signing this consent form, I agree to the following: [tick the relevant block(s)]

☐ That my child will participate in the year-long intervention programme

☐ That the intervention sessions will be recorded by the researcher

I ……, parent of …… hereby give my informed consent for my child to participate in this study. I understand that I will be given a copy of this consent form.

…… ……

Participant's Signature Date

…… ……

Researcher's Signature Date

PART B: Guarantee of Confidentiality

I, Vivien Mumford, hereby guarantee anonymity and confidentiality to

…….. in her participation in my Master of Inclusive Education Research.

Anonymity and confidentiality will be guaranteed throughout the research process as well as in the final dissertation.

……. ……

Participant's signature Date

…….. ……

Researcher's Signature Date

Appendix B: Consent and confidentiality form – mother of research participant

Consent and Confidentiality – mother of research participant

PART A: Letter of Consent

I …… mother of ……... who is enrolled at…… College, have consented to participate in Vivien Mumford's Master of Inclusive Education studies. I am aware that any data collected and analysed in respect of the research will be used in the Master's Research Dissertation which will be submitted to the Education Department at the University of South Africa. I understand that my identity, the identity of my family and all identifying information of the school will be kept strictly confidential and will remain anonymous during the actual research process as well as in the final research dissertation.

By signing this consent form, I agree to the following: [tick the relevant block(s)]

☐ To be interviewed by the researcher

☐ That the interview be recorded by the researcher

I …… hereby give my informed consent to participate in this study. I understand that I will be given a copy of this consent form.

……. ……

Participant's Signature Date

…… ……

Researcher's Signature Date

PART B: Guarantee of Confidentiality

I, Vivien Mumford, hereby guarantee anonymity and confidentiality to

…….. in her participation in my Master of Inclusive Education Research.

Anonymity and confidentiality will be guaranteed throughout the research process as well as in the final dissertation.

……. ……

Participant's signature Date

…….. ……

Researcher's Signature Date

_____

Appendix C: Consent and confidentiality form – educator of research participant

Consent and Confidentiality – Educator as Participant

PART A: Letter of Consent

I …… educator at……. College, have consented to participate in Vivien Mumford's Master of Inclusive Education studies. I am aware that any data collected and analysed in respect of the research will be used in the Master's Research Dissertation which will be submitted to the Education Department at the University of South Africa. I understand that my identity and all identifying information of the school will be kept strictly confidential and will remain anonymous during the actual research process as well as in the final research dissertation.

By signing this consent form, I agree to the following: [tick the relevant block(s)]

☐ To be interviewed by the researcher

☐ That the interview be recorded by the researcher

I …… hereby give my informed consent to participate in this study. I understand that I will be given a copy of this consent form.

……. ……

Participant's Signature Date

…… ……

Researcher's Signature Date

PART B: Guarantee of Confidentiality

I, Vivien Mumford, hereby guarantee anonymity and confidentiality to

…….. in his or her participation in my Master of Inclusive Education Research.

Anonymity and confidentiality will be guaranteed throughout the research process as well as in the final dissertation.

……. ……

Participant's signature Date

…….. ……

Researcher's Signature Date

_____

Appendix D: Consent and confidentiality form – Principal of School for the Deaf

Dear Principal

LETTER OF CONSENT

My name is Vivien Mumford and I am the Principal of a supported mainstream school in Johannesburg. I am currently completing my Master's Degree in Inclusive Education through the University of South Africa.

The purpose of my study is to assess to what extent the THRASS literacy programme may enhance the literacy levels of an Intermediate Phase learner who is deaf and who uses the auditory-oral or spoken language approach. Linked to this is an assessment of the extent to which the use of the Phoneme Machine incorporating the Cued Speech option may support a learner who is deaf with regard to speechreading ability and the disambiguation of phonemes, in partnership with cochlear implants to augment residual hearing.

I hereby request permission to conduct research at your school by observing the classroom implementation of the THRASS programme in the Foundation Phase and the Intermediate Phase with learners who are deaf and who are with facilitators who incorporate Cued Speech in their daily teaching of the THRASS programme. As I will be attending a Cued Speech course the classroom observations will afford me the privilege of observing the THRASS programme being implemented in conjunction with the instructional tool of Cued Speech.

Please note that the identity and all identifying information of your school and your staff will be kept strictly confidential and will remain anonymous during the actual observational research process as well as in the final research report. The school routine will not be influenced by the opportunity to observe the THRASS lessons in action.

I sincerely appreciate the time you have taken to consider this request.

Yours in Education

Vivien Mumford

Consent and Confidentiality – School Principal

PART A: Letter of Consent

I …… the principal of ……. School for the Deaf, have given consent for the School for the Deal to be a site of observational research in Vivien Mumford's Master of Education studies

I am fully aware that any observational data collected and analysed as a result of the research will be used in the Master's Research Dissertation which will be submitted to the Education Department at the University of South Africa. I understand that my school and the staff will be guaranteed anonymity and confidentiality during the actual research process as well as in the final report.

…… ……

Principal's Signature Date

…… ……

Researcher's Signature Date

PART B: Guarantee of Confidentiality

I, Vivien Mumford, hereby guarantee anonymity and confidentiality to the school and staff of …….. School for the Deaf in their participation in my Master of Inclusive Education Research.

Anonymity and confidentiality will be guaranteed throughout the research process as well as in the final dissertation.

……. ……

Principal's Signature Date

…….. ……

Researcher's Signature Date

Appendix E: Consent and confidentiality form – educators at School for the Deaf

Consent and Confidentiality – Educator as Participant

PART A: Letter of Consent

I …… educator at……. School for the Deaf, have consented to participate in Vivien Mumford's Master of Inclusive Education studies. I appreciate that any observational data collected and analysed as a result of the research will be used in the Master's Research Dissertation which will be submitted to the Education Department at the University of South Africa. I understand that my identity and all identifying information of the school will be kept strictly confidential and will remain anonymous during the actual research process as well as in the final research dissertation.

By signing this consent form, I agree to the following: [tick the relevant block(s)]

☐ To be observed by the researcher during the implementation of the THRASS programme

☐ To allow the researcher to make use of a recording device during the observations

☐ To be interviewed by the researcher[2]

☐ That the interview may be recorded by the researcher

I …… hereby give my informed consent to participate in this study. I understand that I will be given a copy of this consent form.

……. ……

Participant's Signature Date

…… ……

Researcher's Signature Date

[2] Interviews could not take place due to time constraints. Lessons were recorded on a digital voice tracer and these are available

PART B: Guarantee of Confidentiality

I, Vivien Mumford, hereby guarantee anonymity and confidentiality to …… in his or her participation in my Master of Inclusive Education Research conducted at the School for the Deaf.

Anonymity and confidentiality will be guaranteed throughout the research process as well as in the final research dissertation.

…… ……

Participant's signature Date

…….. ……

Researcher's Signature Date

_____

Appendix F: Extracts from interview transcripts – mother of research participant

Extracts are from the verbatim transcripts of individual, in-depth, unstructured interviews carried out with the mother of the research participant, Sally.

'M' refers to 'Mother' 'R' refers to Researcher 'Sally' refers to the pseudonym used for the research participant

Extract One

R: First of all, thank you for allowing me the privilege of assisting your daughter. Please be rest-assured that all discussions between us will be treated with the utmost confidentiality. I would like to record this interview so that I may give you my undivided attention if that is acceptable to you. If you are concerned or unsure in any way with any aspects of the research undertaking, please do not hesitate to pop in and have a chat with me.

M: No, really; it doesn't matter. I just want what is best for my child, so any help you can give her, I will appreciate it.

R: Well, I'm sure that that the questions that I may ask you during our conversation have been answered *many* times by you over the years, but I will appreciate it if you could bear with me in answering these questions so that I may gain an overall understanding of Sally. I would just like to gain a historical 'picture' of your daughter.

R: How many children do you have and how old are they?

M: I have two children. My boy is 14 years old and Sally is 11 this year.

R: Lovely, a pigeon pair. Tell me, how did you experience the course of your pregnancy with Sally? How was she delivered? How much did she weigh at birth?

M: Sally was born a normal health baby at …… Hospital Tuesday 9th December 1997 at 2pm, weighing 2,70kg. I carried full term and had a normal birth. We had no problems with Sally.

R: Was Sally breastfed or bottle-fed?

M: I breast feed for a month and started her on S26 formula because she did not like de breast.

R: At what age did Sally get her first tooth, begin to sit, crawl, walk, and say her first words?

M: I can't really remember, but I tink she got her first tooth at about 2½ months, she began to sit at about 5 months, but she didin crawl; she shuffled on her bum, den she just got up and walked at 10 months.

R: When did Sally start making sounds and at what age did she say her first words?

M: She started to say 'da', 'baba' and other funny sounds at about 4 months, den at 10 months she was saying some words like 'dadah', 'mumah', 'nanah', 'juice' 'go doodoo'. When she was at nursery school she used to learn to count and sing songs.

R: So, would you say the Sally's ability to hear was intact at that stage?

M: Oh, yes! Sally was learning to speak very quickly!

R: So, was Sally able to speak in proper sentences at 18 months?

M: Yes, Sally was *very* clever. She picked up a lot at nursery school from the other kids because she was dere from 3 months.

R: Did Sally experience any serious illnesses during her toddler years?

M: Yes, at 8 months she was admitted to hospital with bronchitis. She was in hospital for a week because of the severe bronchitis and pneumonia. We had to see her paediatrician 3 days later for some results. De results showed Sally was to be put on asthma medication for a while. She started using de asthma pump for kids. The doctor said it was not dat severe she should grow out of it in time.

R: Does L still use an asthma pump?

M: No, it's not really necessary any more. But den, when L was 16 months old her brother got very sick- he was fitting and he stopped breathing. We phoned the ambulance but they took an hour and a half. We phoned Netcare 911 who talked us through CPR and he was not responding. Den the ambulance came and all the ambulance guys tried for an hour and a half. We tought we had lost our son. Eventually he started breathing again. They stabilised him at de hospital but den he started fitting again so dey rushed him to ICU. He was dere for a few days because he had contracted encephalitis meningitis, but he recovered with no side effects.

R: Gosh, that must have been a terrible experience for you!

M: Mrs ……., I can't tell you how bad it was for us! But den in September when Sally was 20 months old, she developed a high fever which we could not control. It was a public holiday but I phoned the house doctor who agreed to open her surgery and meet us dere to check on Sally. When she saw Sally she said Sally was very dehydrated and we must take her to hospital. So she was put on a drip but her fever was not breaking. Den she was sent to the paediatric ward. The nurses said that they will not call the doctor now as she is just dehydrated – de doctor will see her on his rounds at 6pm. While we were dere her fever just got higher and higher. She became delirious, had no idea where she was or who we were. De only ting she last remembered was being at school. So all she asked was for her teacher and friends. Dere was a student nurse who helped us by damping her down with cold water, but it was not helping. She just got worse. The doctor eventually came on his rounds at 6pm. The minute he saw her he rushed her to an isolated ward took tests. By then Sally could not see or hear us. The doctor asked the head nurse why he was not

called immediately. By the reaction of her ways dey should have seen she was not just dehydrated. A few hours later de doctor came in and gave us de bad news. Sally was diagnosed with meningitis, but hers was more serious than what we went troo with …. (the son). Sally had pneumococcal meningitis.

R: What was the prognosis? What did the doctor say?

M: De doctor was up front with us from de beginning and told us how serious her condition was and could not give us immediate answers. We have to accept answers on a day to day basis.

Tings for Sally never improved, it got worse. She was seen by many doctors for deir input and put on 3 different antibiotics but nothing was helping. She was in hospital for just over a month. In total she had 4 lumber punches done on her, every test there is available including x-rays and bone tests to determine why her fever is so high and not stabilizing. During her stay we noticed that Sally was not hearing too well. We confronted the nurse, but she said it was nothing; we must not worry, we were imagining, but we are her parents and knows when our child is not herself. When we saw the doctor we told him about our concerns and he referred us to the Hearing Clinic. We were told dat Sally had lost 60% hearing due to post meningitis and she had to be fitted with digital hearing aids.

R: How did Sally cope with the hearing aids? Could she hear properly?

M: Well, after 6 weeks on Digifocus hearing aids she started to babble and lip read a little, but we were very unhappy with the results so we took her another opinion and the professor said that Sally was *totally deaf*! We had no idea what to do! How do one take news like dis? No hearing aids could help her and every time she had hearing aids the moulds affected her ears- she always had ear infections.

R: It must have been an incredibly difficult time for you! What did you decide to do next?

M: We took Sally to the 'deaf school' for a few days and dey said dey could help her and teach her signing. We were not happy with Sally going to the deaf school as we wanted her to learn to talk and not just use signing. We heard about cochlear implants and I started to research den we went to speak to Professor ……. at The Centre for Language and Hearing. The professor explained the procedure and told us Sally was a candidate, but we must not leave it too long because of calcification build-up around the cochlea. We managed to raise only R42 000-00, and we battled to get anyting from the medical aid, but den the professor said he would help us because it was urgent, so she had her first operation in March 2002.

R: So Sally 'lost' her ability to hear in about September 1999 at about 20 months of age and only got her first implant in March 2002? (4years 3 months)

M: Mrs ……., it was so very difficult to collect funds, but eventually the professor persuaded the medical aid to also pay.

R: Did she have dual implants?

M: No, dey did the right ear first and den when she was switched on 6 weeks later she was given a trial at the Centre and she started progressing well with teraphy. By de time she had the second implant 3 years later (March 2005) dey only managed to get in a short electrode because most of her cochlear was damaged already. (7yrs 3mths)

R: Why did it take so long between implants?

M: Because we had to fundraise all over again – it is very expensive and it took a lot of time.

R: How has Sally progressed up until now with both implants?

M: Since she switched on we have noticed a big change in her. She attends speech teraphy 3 times a week at the Centre and she has attended a special school up til now, but since we have brought her to your school she is learning so fast and she is so bright and hard-working and I'm so very happy dat you have given my daughter this special chance to mix with all kinds of children in a normal school. At de other school the other children had very serious problems. In the time she has been here I have seen an amazing difference in her. She is so happy to learn new tings. Thank you for giving my daughter such a good chance to prove herself.

R: Does Sally make use of gesturing and signing as well as speaking?

M: Sally used to use gesturing a little bit at first, but she doesn't any more – she just has to see the face of the person who she is listening to, or she cannot 'lip' the message properly.

R: Mrs ……., how does Sally integrate in the family and with relatives and friends in a social context?

M: Sally is very talkative and friendly! She is always smiling and gets along with everybody.

R: Mrs …….. just one final question. With regard to listening, speaking, reading, spelling and writing how would you describe Sally's areas of strength and where do you think she requires additional support?

M: Sally can read well, but she doesn't always understand what she reads. She has a very good memory. If she learns her spelling words each week she always gets 100% - she really practices very hard and she loves to get high marks or she is not happy with herself. Sally does not have an imagination and she battles to write sentences and stories, but she uses a dictionary a lot. Sally has taught herself to lip and she's very good at it, so long as she see your face clearly she will understand you. Her speaking is of a level dat we can all understand her well.

R: Mrs……, thank you so very much for sharing your story with me. It is an honour for me to be given this opportunity to assist your child and Mrs …….., her class teacher and myself will do our utmost to help her achieve her potential – she is such a lovely child.

Extract Two

R: Hello, Mrs ……, thank you so much for popping in for an update regarding your daughter, Sally.

M: No, it's good because I want to help my daughter where I can. If you just tell me what to do I will work with her.

R: How is Sally enjoying the THRASS programme so far?

M: Yes, she is enjoying it. She likes to play on the computer and do the THRASSIT programme because she can practice her reading and spelling. She tries very hard to read and say the words properly and it is helping her with her speech.

R: Tell me something, how is Sally managing to sing the THRASS songs using the Sing-A-Long interactive software together with the book?

M: Oh Sally is really battling with some of the songs because they are *so fast!* She tries to follow the words in the book and sing the song at the same time, but she can't say the words fast enough, so I said to her she must just read the songs in the book first, den she can get used to it before she tries to sing also.

R: Yes, I must agree that some of the songs are sung to a very fast beat and Sally also battles during the THRASS class Sing-A-long sessions – she just can't articulate the sounds and the words fast enough! However, it is far better for her to practice reading the song lyrics from the book at her own pace as this will develop her ability to recognise the phonemes.

M: Can you just go troo (through) the charts and books and computer programmes again so I can help her at home and know what I'm doing is right?

R: The phonemes are the 44 sounds represented on the yellow THRASS chart. There are the 24 consonant phonemes first, and then the 20 vowel phonemes. Here, let me show you the chart that Sally has and then I can explain to you how you can help her practice and how the THRASSIT software compliments the chart. Remember, there are 44 songs to learn so it will take quite a long time and she must work at her own pace or she will become despondent! (*The Sing-A-Long book together with the software applications and the THRASS charts were discussed at some length).*

R: Apart from the THRASS programme, how has Sally been coping generally in her school subjects?

M: Sally has been coping well in school, but she has been having problems with her second cochlear implant.

R: Is that the one in her left ear which is the weaker ear?

M: Yes, that's right. She has been feeling shocking feeling in the side of her head and you can't even touch her ear. We did tests, but could not find anything. We tried switching on again but she said it was too loud, even tough (though) there was no sound transmitting!

R: That's very strange!

M: I been puzzled by dat I did some testing on her and spoke to her, asking her to explain exacting what she was feeling and figured out that the sound she is saying is loud was exactly the shocking sensation she was getting in her head and she showed me on my hand what she is feeling, it feels like electric wires touching and it shocks you, dat the feeling she was getting, with tremendous headaches to add to dat. We spoke to the audiologist and decided to take the device off her ear for a while and see if dat helps.

R: Yes, she has also complained at school that she has headaches and she is feeling shocks in her head. With the device off the left ear, we have made sure that Sally is seated in a favourable position in class so that she can speechread and make use of her right ear for residual hearing.

M: Thank you, it is a big worry because we do not know what is going on with her and we will have to take her for more tests.

R: Well, please keep the school informed of events so that we may continue to support Sally to the best of our abilities. Thank you for coming in for this interview to update us on Sally's position. Could we please schedule an interview update once you know what is going on?

M: Yes I will and tank you for what you are doing for my child.

Extract Three

R: Hello, Mrs …….. thank you so much for popping in to give us an update of what has transpired in respect of Sally and the problems she has been experiencing with her left ear.

M: Oh, Mrs…… it has really been a battle and my poor child has gone troo (through) so much in her life and now she is still suffering.

R: I'm so very sorry to hear this. She complains often during class about the shocks she feels in her head.

M: We started testing again - x-rays and blood test – you name it we did it the mean time the device is off.

R: We have noticed at school that Sally's speech ability is deteriorating.

M: The Me-del people came from overseas to test the device, but they said there was nothing wrong with the outside processor or the inside device. We even considered taking the device out, but if they did not find a fault that we would be responsible for the costs. In the meantime our financial situation is worse and we cannot afford for Sally to go for speech therapy and this is something she desperately needs especially with hearing with only one ear. I as her mom and very close friend has seen the difference in her speech, her listening and ways. We have noticed she misses the small words in sentences, misses the ending of words and she is swallowing her words. At home when we have a get together she finds it difficult to communicate with her cousins and friends as she gets lost in the conversation because it is difficult for her to grasp what is being said. So instead she rather not join dem and feel left out and look stupid.

R: Yes, we have noticed similar problems at school, but Sally works very hard and she is achieving well in her subjects despite these problems.

M: Mrs……. I cannot thank you people enough because you keep my child after school and help her with all her subjects and read with her and explain words to her and help her to speak sounds.

R: Sally is so motivated and she has such an excellent work ethic that it is an absolute pleasure to offer her regular additional support. She is coping well with the THRASS programme and seems to be enjoying it. Even if she is battling to articulate the sounds she is still making progress with reading and spelling. So we just make sure that she can speechread and we favour the right ear to support residual hearing.

M: How much this child goes troo (through) but she will still try her best she really is a gem of a person, loving, caring ,and makes you cry to see how determined she is to achieve her goals. She works on her THRASS charts and the computer programmes

every day – she tries so hard to sing the songs, but if one does not know her it will be extremely difficult to understand what she is singing! Because I trained her and coached her I push her and correct her all the time. We have a special bond just like I know her so well and she knows me just as well.

R: Mrs……I'm sure that once these problems have been sorted out Sally will be speaking like she used to again!

M: Oh I hope so soon because I am stressing for her and I don't want my child to suffer like this because her head is still paining.

R: Well we'll help wherever we can and thanks, once again, for giving of your time.

Extract Four

R: Hello, Mrs…….. How are you keeping? Sally tells me that you have been sick and in hospital.

M: Yes, I have been troo (through) a tough time with my back and my stomach. The doctors are doing tests to find out why I'm having so much pain all the time.

R: I'm very sorry to hear that – please let us know if you ever need help with transport for Sally and we'll try arranging something.

M: Ah, thank you so much, but lucky my father-in-law is helping us now.

R: Sally's left ear processing device has been switched back on for quite a while now and she has been to hospital to have fluid drained from her ear. Can you give me an update on what's been happening recently?

M: Well, de cables and batteries were checked again and Me-del and de audiologist found nothing wrong so we decided to switch her back on again because her speech was just getting so bad. Dey did mapping and for a while she was okay hearing again and the pain subsided. Not sure why or how, but we were happy. I started testing and making her practice to hear from each ear and her speech has improved a lot.

R: Oh, yes, we have noted a huge improvement in Sally's spoken language ability. She can now articulate the THRASS phonemes much more successfully, although she still battles with certain sounds.

M: Yes, we still battle with some sounds and Sally can't hear the 'pee' or the 'bee' or the 'gee' and a few others. But Sally has had it on again for about 3 months now, but the pain started again. I don't know why or what triggers the pain - maybe stimulation of the sound waves not sure, but the pain continued. We did whatever possible or whatever we were told to from x-rays, blood tests, ultra sounds, physio, seeing a physiotherapist, psychologist, psychiatrist, doing acupuncture, reflexology, had her on medication for pain, antidepressants, antibiotics, muscle relaxers, you name it she has been on them. The pain just gets worst and all we get from the doctors is there is nothing wrong, maybe its hormones or attention or imagination but it is not. They did more scans and took her for a procedure two weeks ago to drain fluid. Once the fluid was drained and after recovery she seems okay again.

R: Well, Let's hope that the problem has been sorted out now!

M: Ummm… I'm not sure yet that it is all right, but I hope so because I don't want Sally to suffer any more and she has started to speak so nicely again.

R: How are you finding the THRASS programme at this stage?

M: Sally really enjoys it and she uses the dictionary a lot and she is learning new words and it is helping her work out words she can't read……

Extract Five

R: What was your overall impression of the THRASS programme?

M: I was impressed an excited to see the outcome.

R: How did Sally cope with the Sing-a-long book and the songs on the computer?

M: Difficult in the beginning, but tried her utmost to cope, she enjoyed the songs and did follow the words and continued until she could get them close to correct. But some songs were too fast for her to keep up.

R: What are your impressions of the Phoneme Machine?

M: Yes I did sit with her and learn as well, it was fascinating

R: Did you see Sally practice the Cued Speech option of the Phoneme Machine? What are your thoughts about this?

M: Yes I do, I interact with her. I have seen that it helps her to put together long words and understand better the difficulty with pronunciation and if she does not know the word she will break it up until she gets it.

R: Have you noticed an improvement in Sally's ability to read and write?

M: Yes I did. I have seen how hard she tries her spelling is great once she understands she copes well. If she reads slowly she pronounce good and understands what she reads and cope with new words. She tends to look up or ask what words mean if she is not sure, she breaks up the words to say them out aloud than ask the meaning. I see when she is writing a letter or sending me messages she does it well and it makes sense.

R: Did you see any improvement filtering through into her ability to understand the text books and notes in other subjects?

M: Yes. I have, an believe me she tries her utmost to work as hard as she can to get everything correct. She is such a perfectionist and will prove that she can no matter what.

Appendix G: Extract from interview transcript – educator of research participant

'E' refers to 'Educator' 'R' refers to Researcher 'Sally' refers to the pseudonym used for the research participant

Extract:

R: Hi, ……, thank you for taking this time to discuss Sally with me.

E: Only a pleasure….I'm really excited about starting THRASS with the children. The group is really going to enjoy learning those songs and doing the actions!

R: Well I have performed all the baseline assessments on the rest of the group, but as we discussed before, I need you to sit in during the assessments with Sally so that you can make observations and write notes for discussion afterwards. Then we can compare your notes with my observations.

R: As you know we have to stretch the tests over a few days because some of the tests are quite time-consuming. But before we do the pre-tests, there are a few questions that I'd like to ask regarding Sally's performance with regard to her reading, spelling and writing.

E: No problem.

R: Firstly, what impression do you get of Sally's reading, spelling and writing ability?

E: Well, you know what? Sally is a very motivated and determined girl! She tries so hard to learn her work and achieve good marks and she is very disappointed with herself if she doesn't score well in tests. When she learns her spelling for tests she doesn't make too many errors, but then she promptly forgets the spelling from the word list soon after!

R: I guess that happens with many of the children!

R: Tell me, what have you observed with Sally's language ability when she is speaking in class discussions and lessons?

E: Sally mispronounces quite a lot of words but I suppose this is understandable. The other day I heard her at the tuck shop asking for 'crips' and a 'miksake' instead of 'crisps' and a 'milkshake'. She seems to spell the way she speaks. What I have noticed is that she uses short, simple sentences when speaking. She doesn't use much use of adjectives and adverbs. She also tends to miss out words in sentences and she uses words out of context. She relies a lot on her mates for help and she tends to misinterpret instructions. Another thing that I've noticed is that she often asks the meaning of words over and over again until she understands.

R: What is the level of her written work in respect of sentence construction and creative writing?

E: Oh, She really battles to write sentences with the correct word order and her creative writing skills are poor, but I encourage her to use a dictionary as much as possible.

R: What specific problems have you noticed with her sentence construction?

E: Well, she leaves out word endings, particularly the suffixes –ed and –ing and she misses out auxiliary verbs, infinitives and words like 'the'. She constantly mixes her verb-tenses as well. For example, she'll write 'she was cry'. Oh, wait a minute; I've also noticed that she uses the word 'did' like in 'she did walk to shop'.

R: And her reading ability?

E: Sally seems reticent to analyse words that she can't read. She guesses, refuses or asks for assistance when she comes across a difficult word. She needs a lot of encouragement. Her reading is quite halted and I think that she battles to comprehend because she is has such a limited vocabulary and she doesn't seem to want to break up and build words.

R: What are her comprehension skills like?

E: She seems to look for key words in questions and tries to find the same words in the passage, which is all good and well, but then she tends to just copy the sentence – she doesn't change the structure of the sentence to answer the question properly. She also battles to read between the lines, or give her opinion and substantiate her answer.

R: Thanks,……..this has given me quite a good idea of what to expect next week when I test her.

E: Pleasure,…….anytime.

R: Bye, see you tomorrow.

E: Cheers, ……..

Appendix H: Cued Speech Chart

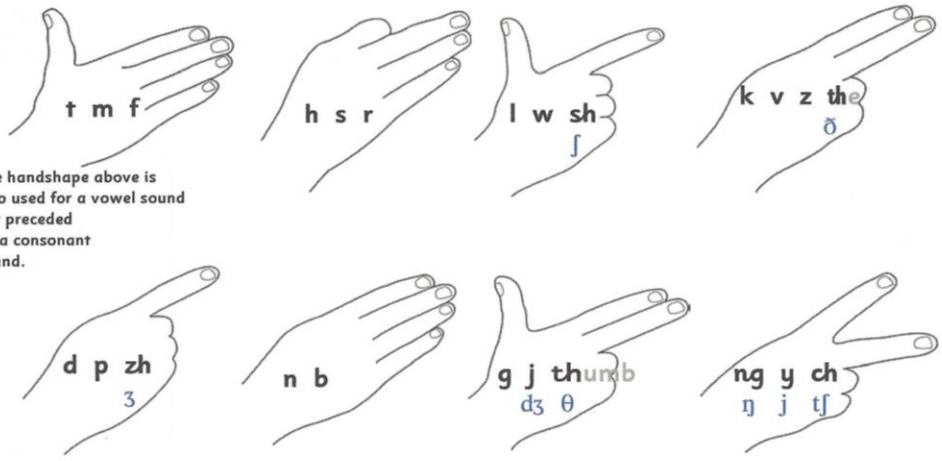
Cued Speech Chart

With International Phonetic Alphabet (IPA)

Cued Speech

Complete spoken language through vision

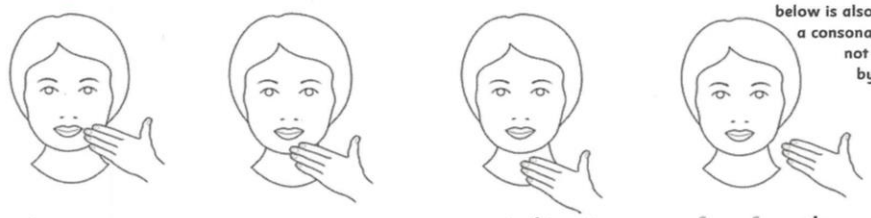
Handshapes show consonant sounds



The handshape above is also used for a vowel sound not preceded by a consonant sound.

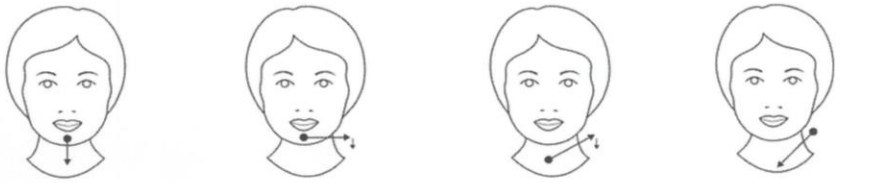
Hand positions show vowel sounds

The side position below is also used for a consonant sound not followed by a vowel sound.



eat more up	egg on you	put it at	far fur the
iː ɔː ʌ	e ɒ uː	ʊ ɪ æ	ɑː ɜː ə
			side fwd / side fwd / side down

Diphthongs, where one vowel sound runs into another (e.g. air, eye), are cued by moving the hand from one position to another as shown below.



baby boy	hair	ear euro	eyes nose mouth
eɪ ɔɪ	eə	ɪə ʊə	aɪ əʊ aʊ

To cue words put the consonant handshape in the position of the vowel which follows it e.g.
to cue 'pea' hold the /p/ handshape in the /ea/ position as you say the word
to cue 'me' hold the /m/ handshape in the /ea/ position as you say the word.

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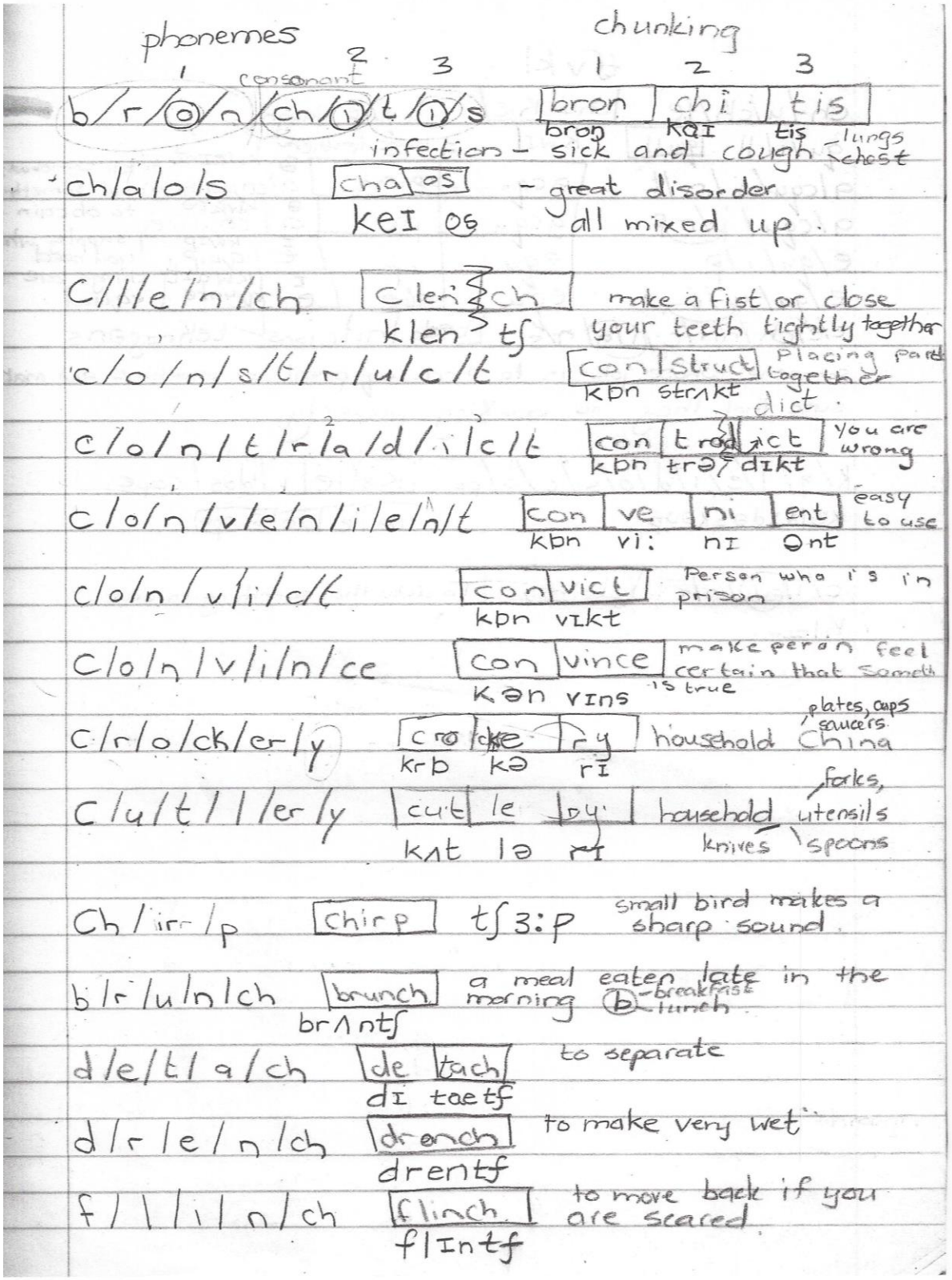
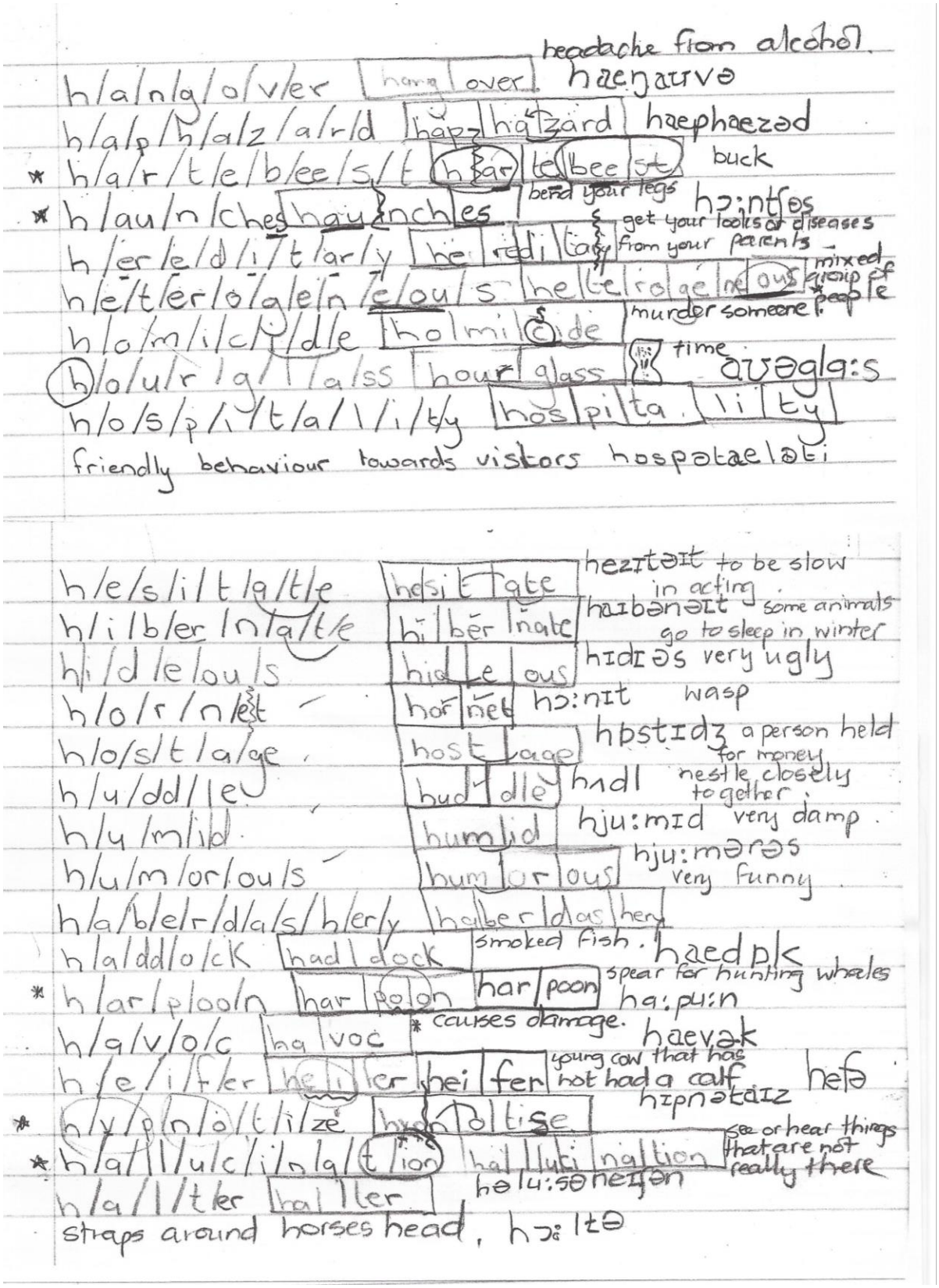
Appendix I: Alternative word bank



Appendix J: Field notes from researchers journal



THRASS 500 SPELLING TEST

THRASS SPELLING PERCENTAGE

TSP 87%

RS 435/500 SS 87%

435 x 2 = 870/10

Errors

Insertions: ✓ rand / ran
eg ✓ rent / red
✓ younger / young
× polices / police

Omissions: ✓ peas / please ✓ was / wasp
eg ✓ staped / stopped close / closed
× Sepember / September of / off *
✓ Febuary / February

Long Vowel Monophthongs i:
✓ chesse / cheese ✓ sleve / sleeve
✓ sixty / sixteen

Vowel ~~Digraphs~~ : ea (eg)

3 ✓ thersure / treasure
✓ measurce / measure
} transpositioning

Affricatives : dʒ
✓ hatch / hedge ✓ biath / bridge

Unstressed syllable (schwa):
coller / collar - month / mother moter/motor

Consonant trigraphs:
✓ swrew / screw

Substitutions: Fricatives z/s
✓ tries / tried ✓ fis / fizz

Diphthongs: aʊ
plawn / plough

Long Monophthongs: uː ✓ ballon / balloon
soup / soap əʊ

Transpositions: ✓ suddleny / suddenly ✓ zerba / zebra
✓ olw / owl ✓ friut / fruit

Reversal: panpa / panda

07:00 (Story: A Kaleidoscope) · k|a|l|e|i|d|o|s|c|o|pe

07:30 * Kaniscope. kal|e|i|dos|cope.

08:00 invent(ed) omission instead of Ka|lei|dk|scope
Guessed dictionary
Kelaidoskəʊp

08:30 * Although – 'allthrew'

* Processious – Procedure.

09:00 Confused verb tenses. -K s are

09:30 * Had to teach her how to find rhyming

10:00 words by onset substitution eg bunch
punch
lunch etc
crunch
hunch.

10:30

11:00

11:30

12:00 * leaves off suffixes -ed. tenses

13:00 * lexicon – utensils. u|ten|sils ✓ (y)

14:00 * poor cloze procedure: + context

14:30 Although – A|l|th|o|u|g|h ✗ * did this visually – not

15:00 phonemically Al|though ✓ but chunked ✓

15:30 ɔːl ðəʊ → battled with quadgraph.

16:00 Procedure p|r|o|c|e|d|ure ✓ pro|ce|dure

16:30 prəsiːdʒə

17:00

07:00 Phoneme box me beach tree key pony
[i:] e ea ee ey y

07:30 Vowel Row / * GCA ie/ei

08:00 • Use Spellbound Phonographix THRASS 500

08:30 THRASS dictionary Oxford Dictionary Colour Reading BK2

09:00 • Build up word bank in THRASS Word Book

09:30 by segmenting words into phonemes → spelling choices. then blending for reading

10:00 • Read words in context and do comprehension

10:30 exercise

11:00 • Look for [i:] phonemes in story.

11:30 OBSERVATIONS

12:00 • Put word 'heavy' 'e' in the ea column

13:00 • Lexicon - didn't know 'abbey'; 'plucky'; 'grieve';
'fiend'; 'frieze'; 'retrieve'; 'seige'; 'seize' 'eve';

14:00 'deceit'; 'conceit'; 'deceive'; 'perceive'; 'conceive'.

14:30 • Missed out 'Pēte' in the ē column + 'scēne'

15:00 • Put 'heavy' in i: column (Looks at GRAPHEMES, not PHONEMES)

15:30 • Incorrect phoneme split of 'eighty' ~~eigh ty~~ (quadgraph)
e igh t y x

16:00

16:30

ERRORS

07:00 Green Word Story [i:]

07:30 • Left out the following i: words:

08:00 Pēter ēvening

08:30 • Inserted the following words incorrectly

09:00	they [eɪ]	guy [aɪ]	head [e]
09:30		by	leapt
10:00		dried	weather
10:30		sky	
11:00		buy	

11:30

• Comprehension

12:00 1) Omission 'the'

13:00 2) ✓

14:00 3) Transcription + Transposition breeze/brezzee

14:30 4) ✓

15:00 5) x Didn't understand "Describe ... clothes" Key words

15:30 6) ✓

16:00 7) Error of Concord "The parents was (Verb Tenses)

16:30 8) Syntax "because the? loves the"

17:00

17:30

07:00 TOUGH TUMBLEWEED. ð θ

- thistle → doesn't know if its hard or soft.

07:30

- ancestors → left ce as a digraph not 2 graphs.

08:00

08:30

- thistle - didn't know silent (t) so pronounced it. but when we did IPA she saw it was silent

09:00

09:30 • marbles - chunked it straight from passage herself. ☺

10:00

- Legendary - tried to ↗. Just a little incorrect.

10:30 Tried to do phonemes but put ar as a di not a graph

11:00 diary → instead of 3 chunks → because y is like a vowel.

11:30

- automobile → correct phonemes - but chunked auto - tell me.

12:00 What's wrong - I don't know. Check ur vowels → YES au/to

---

13:00 SITTING ON THE SEA.

Braces has a plate in her mouth so articulation is significantly

14:00 compromised.

- bathing as in a: looked up in pronunciation dic. beiðIŋ

14:30 Read very well

15:00 ABOARD THE SANTA MARIA...

- Battled to pronounce "Atlantic" + personally so we chunked it + she succeeded.

15:30

- Foreign - can't (P), can't chunk - so we put into

16:00 Thrass bk to IPA - fɒrən

- Can't P 'determined'. THRASS IPA - pronunc. dictionary.

16:30 dɪtɜ:mənd.

17:00 • Errors in sent const - verb tenses in comprehension answers.

17:30

- Lexicon - mutiny mu:tɪnɪ

Appendix K: An example of Sally's written expressive language at the culmination of the THRASS intervention

55 Sunray Street
Bay Beach
14 November.

Dear Aunt and unde

Thank you for your wonderful letter that you have sent to me hope you doing well, I did have a nice time with my holiday it was so much fun.

I would like to say thank you for let me staying with you, it was a great time I love the places that you took me with. My flight was very nice I did enjoyed my flight but it a very long flight to fly back home but I did went home safe. I was welcome to go to the beach. I would love to talked about my holiday the most I enjoy is about the clipper ship because it was most exciting ever and I also enjoying surfing with my cousins. When I came home from my holiday my family was surprise me with the decrate the house, they were very happy to see me and they took me to the movies at the shopping mall. My mom said I would have a party at my house so I would love to invite you to my party and bring you family with and don't forget to bring your swimming costume with you if you come to my party.

Thank you for inviting me to stay with you I hope I can see you again and I hope that I will see you on my birthday party please let me know if you can make it. thank you a lot see you soon!

Love from you family Olivia.